White Papers Prepared for the Workshop

Digital Libraries for the Maghreb

Washington, DC – January 24-25, 2011

A Collection of White Papers Prepared by Participants
in the workshop convened by the

Fulbright academy
SCIENCE & TECHNOLOGY

with financial and organizational support from
US National Science Foundation
US Department of State
US Institute for Museum & Library Services
US Library of Congress

The papers in this collection were prepared and distributed as background material for a invitation-only workshop held in Washington, DC on January 24-25.

The funding for the workshop was provided by the US National Science Foundation (Award #1048272), with additional organizational or financial support from the US Department of State/Bureau of Oceans Environment & Science, the US Institute for Museum & Library Services and the US Library of Congress. The workshop was held in English.

The workshop had 62 participants – 50% from the local (DC, MD, VA), 25 % from the rest of the country (15 states), and 25% international. The US participants included people affiliated with 11 federal agencies and 14 US universities. One-third of the participants were Fulbright scholars (US or international) and their experience covered countries such as Albania, Algeria, Armenia, Brazil, Czech Republic, Egypt, Germany, Madagascar, Morocco, Nigeria, South Africa, Spain, Syria, Tunisia, Uganda and USA.

An additional 60+ people were interested in participating in the workshop but were unable to participate due to prior commitments, family issues, poor English language skills, and other reasons.

The meeting was organized and convened by Eric S. Howard, Executive Director of the Fulbright Academy of Science & Technology

US Advisors:

- Dr. Steve Griffin, National Science Foundation / Library of Congress
- Dr. Ronald Larsen, University of Pittsburgh
- Dr. Bill Lawrence, US Department of State
- Dr. Joyce Ray, US Institute for Museum & Library Services
- Dr. John von Oudenaren, Library of Congress

For Additional Information:

Eric Howard, Executive Director
Fulbright Academy of Science & Technology
P.O. Box 284
Cape Elizabeth, ME 04107-0284
Tel: 207-799-3098
www.FulbrightAcademy.org

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Not included in this document due to its size:
US White House Report on Digital Future

All Documents can be downloaded individually from
www.FulbrightAcademy.org/page/DL/

Program Summary:

Monday begins with an optional program at the Smithsonian's Museum of Natural History with a behind-the-scenes tour and discussion on digital preservation.

The workshop itself begins after lunch to review the current activities including content development, management structures, networked infrastructure, research and educational applications, education of digital managers, and training of informationists. We will consider plans and activities of key institutions and identify opportunities for input to enhance the proposed activities. We also will address how enhanced access to digital information will affect business, academia and government

Day two is a presentation of results of the discussions and soliciting input from the broader community. The program includes with a working lunch and then an afternoon session to discuss follow-on planning. The day closes with the meeting of a smaller working group that will summarize the results and the proposed action steps.

The first workshop was held in Rabat in January 2007, with funding from NSF, UNESCO and the Moroccan government. Funding for the workshop came from the US National Science Foundation (Grant # 1048272), with additional travel support for certain attendees from the US Institute for Museum & Library Services.

Selected Meeting Goals:

- Increased collaboration among projects for the region (funded by outside entities)
- Increased collaboration among related projects in the region (conducted or funded by local governments, businesses and institutions)
- Recommendations on additional training needs for "informationists" (librarians, publishers, IT professionals and others)
- Increased awareness of opportunities for dialog and exchange in the Maghreb and in Africa as a whole
- Increased clarity on physical infrastructure status and future needs

Possible Outcomes:

- Influence US-government aid to the region from State Department, USAID and other US Agencies. It also may influence EU projects in the region
- Collaborations between US universities and institutions in the North African region.
- Planning for future meetings, such as the Second International Conference on Digital Libraries and Archives, scheduled for November 2011 in South Africa.
- Planning for initiatives planned by regional and/or international organizations.

Meeting Location:

Donovan House, 1155 14th St, NW, Washington, DC
Contact # of meeting convener: Eric Howard: 207-799-3098 or 207-899-8986

Workshop Papers and Background Documents:

www.FulbrightAcademy.org/page/DL/

Meeting Location:
Donovan House, 1155 14th St, NW, Washington, DC

Sunday, January 23

6:30 PM **Welcoming Dinner for those staying at hotel and locals who wish to join us.**
Meet in lobby of hotel at 6:30. If you arrive late, ask the receptionist at hotel where we went for dinner. Each pays for his/her own meal.

Monday, January 24

9:30 AM **Walk for Smithsonian Museum of Natural History (1.2 mile walk)**
Optional program to see and discuss Digitization Initiatives at Smithsonian
Meet in the Hotel Lobby around 9:20. Depart at 9:30.
DC-area participants who wish to join the tour can meet at the Museum at 10:00
Meet at the 10th & Constitution Ave entry. (2 blocks from Fed Triangle Metro)

11:30 Walk or taxi back to Donovan House
Recommended place for lunch: SOHO Market Café, 1301 K. Street NW
Eat there, or bring your food with you back to the hotel.

12:00-12:50 Registration at Donovan House – Second Floor (accessible via elevator)

1:00 Welcome

Introduction by Eric Howard, Fulbright Academy of Science & Technology
Organizer of this workshop and a similar workshop held in Rabat in 2007
Comments from Ron Larsen, University of Pittsburgh
A participant in prior workshops relating to this topic
Comments from Bill Lawrence, US Department of State
A leader in US Government on Muslim World Science Partnerships
Comments from Mohamed Benbouida, Moroccan Ministry of Higher Ed & Sci Rch
Co-host of the 2007 Digital Library Workshop in Rabat

1:30 Session One: Setting the Stage

Moderator: Eric Howard

- Key international developments in digital libraries since 2007
  - Distributed Repositories – Sarah Shreeves, University of Illinois--Urbana Champaign
- Developments in regional library infrastructure and library networks.
  - Consortiums & Access to science journals – Rima Kupryte, EIFL
- Digital Commons
  - Michael Edson, Smithsonian Institution

Monday (continued)

2:30 Session Two: Impact of enhanced access to digital information/research
Moderator: Brian Rosenblum, University of Kansas Center for Digital Scholarship

- Digitization Projects related to region:
  - Mary Downs, US National Endowment of Humanities
- Professional training / Professional development in the region
  - IMLS work with Morocco – Barbara Moran, UNC Chapel Hill
- Universities & Education
  - US AID: Collaboration between university researchers & other projects – Robert Schware, Academy for Education Development (AED)
  - UNESCO initiative « Espace numérique ouvert pour la Méditerranée » a network of universities around the Mediterranean to share, produce and localise open educational resources – Misako Ito, UNESCO
- Government
  - United Nations: Elida Reci, UN Department of Economic and Social Affairs

3:45 Break

4:00 Session Three: US-based Activities– models and resources for the region
Moderator: David Schimmelpfennig, US Dept. of Agriculture / Econ Rch Serv.
Models for content development, management structure, network infrastructure, research and educational applications, education of digital managers, and training of informationists.

- US National Library of Medicine – Julia Royall
- Smithsonian Biodiversity Heritage Library – Martin Kalfatovic
- US Department of Energy – Walt Warnick
- Internet Archive – Kristine Hanna
- Video Archives – Marshall Breeding

5:15 End of Day One Formal Program

6:00 Meet in Lobby of Hotel & walk to SAIS

6:30 Reception & Talk at Johns Hopkins – School for Advanced Intl Studies
Presentation by Tom DeGeorges, Director, The Center for Maghreb Studies in Tunis.
Food provided by NSF, Fulbright Academy and American-Tunisian Association

7:45 Dinner near Dupont Circle

Tuesday January 25

7:45 Planning Meeting for the Second Intl. Conf. on African Dig. Libs & Archives
Open to all. Bring your own coffee, muffins, etc with you.

8:15 Arrival time, pre-workshop networking

8:45 Welcome & Summary of Day One
Eric Howard, Fulbright Academy of Science & Technology
Welcome from Vivian Ronay, Photographer
Comments from Richard Sapon-White, Oregon State University

9:10 Session Four: 5-8 minute Statements, Comments & Ideas from the Region

- Comments from AIMS – Kerry Adams
- Comments from Tunisia – Rim Nour
- Comments from Algeria – Noureddine Meftouh
- Comments from Morocco: Library training – Abdelhamid Lotfi
- Comments from Morocco: Medical Libraries – Salima M'seffar
- Comments from Fulbright Grantee – Khouloud Khammassi

9:45 Working Groups – review draft recommendations

1. Training of Informationists
   Education of digital managers, education of users
2. Physical Infrastruture and Policy
   Network infrastructure, government policy relating to DLs and DAs
3. Access to and Storage of Electronic Information (databases, etc)
   Content development, cyberinfrastructure, management structures,
4. Digital publishing and advancing scientific research collaborations.

10:45 Coffee Break

11:00 Session Five: Future Plans in the Maghreb and in Africa more generally
Moderator:

- CRDF Global and their Regional Partners – collaboration & communication among scholars, scientists, researchers.
    - Eric Novotny, CRDF
- Second Intl African Conf on Digital Lib & Archives
    - Felix Ubogu, Univ. of Witwatersrand
- Council of American Overseas Research Centers
    - David Magier, Princeton University

Tuesday (continued)

Noon Working Lunch
Working Group Discussion Continued

1. Training of Informationists
2. Physical Infrastruture and Policy
3. Access to and Storage of Electronic Information (databases, etc)
4. Digital publishing and advancing scientific research collaborations.

1:30 Reporting Out from the Working Groups and Discussion

1. Training of Informationists
2. Physical Infrastruture and Policy
3. Access to and Storage of Electronic Information (databases, etc)
4. Digital publishing and advancing scientific research collaborations.

3:00 Future Plans in the Region – A Vision for 2015 and beyond
Non-official, informal remarks from selected participants

- US Department of State, Bill Lawrence
- US Agency of International Development, Alex Dehgan

3:45 Closing Discussions & Identify Volunteers to help with next steps
Moderator: Eric Howard

4:00 – 5:00
Open session for all - a smaller working group will meet until 5:00 pm to frame and clarify the workshop outcomes, discuss next steps and identify people who wish to help preparing the final workshop report.
Additional small working groups may meet to discuss collaborations.

6:30 Dinner for those still in DC.

Wednesday January 26

9:00 Optional Tour of George Washington University Library
Meet at Hotel at 9:00 or at 9:30 at GWU Gelman Library, 2130 H St, NW
Program by Karim Boughida, Associate University Librarian for Digital Initiatives and Content Management at the George Washington University Libraries
A native of Algeria, Karim will demonstrate some of their digitization equipment and discuss projects/initiatives in North Africa. http://linkedin.com/in/kboughida

Noon End of Optional Program & End of Workshop

Attendee List Digital Library for the Maghreb Workshop
Organized by the Fulbright Academy of Science & Technology
Washington, DC, January 24-25, 2011

Ms. Kerry Adams
Executive Director, American Institute for Maghrib Studies, PO Box 210158- B, 845 N. Park Ave, Room 477, Tuscon, AZ 85721-0158
aimscmes@email.arizona.edu Tel: 520-626-6498

Mr. Abraham Azubuike
Chief, Access & Preservation, Dag. Hammarskjold Library, United Nations, Room L-133B, New York, NY 10017
azubuike@un.org Tel: 212-963-3883

Mr. James Bailey
Board Member, Algerian-American Foundation for Culture, Education, Science and Technology, Washington, DC
jimbailey@bailiwick.us Tel: 202-374-1990

Dr. Mohamed Benbouida
Chef de Service, Ministry of Scientific Research, Rabat, Morocco
benbouida@gmail.com Tel: +212 537217655

Dr. Karim Boughida
Associate University Librarian for Digital Initiatives and Content Management, George Washington University Libraries, 2130 H St, NW, Washington, DC 20052
kboughida@library.gwu.edu Tel: 202-994-2332

Dr. Marshall Breeding
Director for Innovative Technologies and Research at the Jean and Alexander Heard Library, Vanderbilt University, Nashville, TN
marshall@breeding.com Tel: 615-343-6094

Ms. Laura Campbell
Associate Librarian for Strategic Initiatives, US Library of Congress, Washington, DC
lcam@loc.gov Tel: 202-707-6695

Mrs. Jane Casewit
Senior Associate in the Education, Mobilization and Communication, Creative Associates International, 5301 Wisconsin Ave. NW, Suite 700, Washington, DC 20015
JaneC@caii.com Tel: 202-772-2105 / 2142

Tom DeGeorges
Director, Centre d'études maghrébines à Tunis, B.P. 404, Tunis, Tunisia
cemat@aimsnorthafrica.org Tel: +216 71 326 219

Dr. Alexander Dehgan
Science and Technology Adviser to the Agency Head, US Agency for International Development, Washington, DC
adehgan@usaid.gov Tel: 202-712-4137

Dr. Mary Downs
Program Officer, National Endowment for the Humanities, 1100 Pennsylvania Ave., NW, Suite 411, Washington, DC 20506
mdowns@neh.gov Tel: 202-606-8456

Mr. Michael Edson
Director of Web and New Media Strategy, Smithsonian Institution, Washington, DC
edsonm@si.edu Tel: 202-633-8447

Ms. Julie Egan
Economic Advisor, Middle East/North Africa, US Department of State, 2201 C St, NW, Washington, DC 20520
EganJM@state.gov Tel: 202-647-8350

Dr. Fatma Elkory Oumrane
Director of the Library, University of Nouakchott Library, Nouakchott, Mauritania
felkory@yahoo.fr Tel: +222 642 05 95

Mr. Charles Greenberg
Librarian and Coordinator of Curriculum & Research Support, Yale University School of Medicine, New Haven, CT
charles.greenberg@yale.edu Tel: 203-737-2960

Mr. Stephen Griffin
Program Director, Library of Congress, Washington, DC
sgriffin@loc.gov Tel: 202-413-1823

Dr. Louise Guenther
Archives Specialist, Records Management Division, National Archives and Records Administration, Washington, DC
louise.guenther@gmail.com Tel: 202-421-9994

Ms. Kristine Hanna
Director, Archiving Services, Internet Archive, San Francisco, CA
kristine@archive.org Tel: 415 561 6799 x5

Mr. Jacques Hellemans
Digital Libraries Advisor, Free University of Brussels, Ave. F.Rooseveld 50 - CP 181, Brussels, B-1050 Belgium
jhellema@ulb.ac.be Tel: +(32)(2)6504417

Ms. Sabina Henneberg
Staff member, Creative Associates International, 5301 Wisconsin Ave. NW, Suite 700, Washington, DC 20015
sabinah@creativeworldwide.com Tel: 202-772-2105

Mr. Eric Howard
Executive Director, Fulbright Academy of Science & Technology, PO Box 284, Cape Elizabeth, ME 04107-0284
ehoward@FulbrightAcademy.org Tel: 207-767-8073

Dr. Janice Hyde
Director of GLIN, Global Legal Information Network, Library of Congress, 101 Independence Ave., SE, Washington, DC 20540-3000
jhyde@loc.gov Tel: 202-707-9836

Ms. Misako Ito
Communication & Information Officer, UNESCO, Office for l'Algérie, le Maroc, la Mauritanie et la Tunisie, 35, avenue du 16 novembre, Rabat, 1777 Morocco
m.ito@unesco.org Tel: +212 (0)5 37 67 03 72/4

Mr. Martin Kalfatovic
Assistant Director, Digital Services Division, Smithsonian Institution, Washington, DC
KalfatovicM@si.edu Tel: 202-633-1705

Ms. Khouloud Khammassi
Graduate Student in Technical Communication, Texas Tech University, P.O. Box 43091, Lubbock, TX 79409-3091 (originally from Algeria)
khouloud.khammassi@fulbrightmail.org Tel:

Mr. Quinn Koller
Librarian, CGFNS International, 3600 Market Street; Suite 400, Philadelphia, PA 19104
qkoller@cgfns.org Tel: 215-222-8454 x270

Rima Kupryte
Director of Electronic Information for Libraries, eIFL - Electronic Information for Libraries, PO Box 2290, Utrecht, 3500 GG Netherlands
rima.kupryte@eifl.net Tel: + 39 06 5807216/17

Dr. Mary Ellen Lane
Executive Director, CAORC - Council of American Overseas Research Centers, P.O. Box 37012, MRC 178, Washington, DC 20013-7012
lane.maryellen@caorc.org Tel: 202-633-1599

Dr. Ron Larsen
Dean, School of Information Sciences, University of Pittsburgh, 135 North Bellefield Avenue, 514 Information Sciences Bldg., Pittsburgh, PA 15260
rlarsen@sis.pitt.edu Tel: 412-624-5139

Dr. William (Bill) Lawrence
Advisor for Islamic World Science Partnerships, US Department of State, OES, 1990 K St, NW, Suite 410A - SA-23, Washington, DC 20521-0410

lawrenceWA@state.gov Tel: 202-663-2619

Dr. Abdelhamid Lotfi
Vice President for Academic Affairs, Al Akhawayn University, Avenue Hassan II, Ilframe, Morocco
A.Lotfi@aui.ma Tel: 212+(0)535 86 21 71

Dr. David Magier
Chief Library Consultant, Council of American Overseas Research Centers and Associate University Librarian for Collection Development, Princeton University, One Washington Road, Princeton, NJ 08544
dmagier@princeton.edu Tel: 609-258-5710

Dr. Kathleen McCarthy
Librarian, Seton Hall University School of Law, One Newark Center, Newark, NJ 07102-5210
kathleen.mccarthy2@shu.edu Tel: 973 6428769

Mr. Noureddine Meftouh
Head of CERIST Library, Centre for Research on Scientific and Technical Information, 03 Rue des Freres Aissou, Ben Aknoun Alge, Algeria
nmeftouh@mail.cerist.dz Tel: + 213 661 92 56 83

Dr. Clifford C. Missen
Director, the WiderNet Project, University of Iowa, School of Library & Info Science, 201 Comm Center, Iowa City, IA 52242
missenc@widernet.org Tel: 319-335-2200

Dr. Barbara Moran
Professor and Coordinator, University of North Carolina--Chapel Hill, 211 Manning Hall, CB 3360, Chapel Hill, NC 27599-3360
moran@ils.unc.edu Tel: 919 962-8067

Dr. Heather Moulaison
Assistant Professor, University of Missouri--Columbia, School of Information Science & Learning Technologies, Columbia, MO
moulaisonhe@missouri.edu Tel: (573) 884-2670

Ms. Salima M'seffar
2010 International Associate Fellow at US National Library of Medicine & Librarian, National Institute of Hygiene, Rabat, Morocco
m_salima2000@yahoo.fr Tel:

Dr. Javad Mustafa
Frances Carroll McColl Term Professor, University of North Carolina--Chapel Hill, School of Information and Library Science, Chapel Hill, NC
jm@unc.edu Tel: 919-962-2182

Mr. Kris Nelson
Program Specialist, Office of Strategic Initiatives, Library of Congress, Washington, DC
knel@loc.gov Tel: 202-707-5764

Ms. Rim Nour
International Development Consultant, Tunis, Tunisia
rn2185@columbia.edu Tel: +216 24 17 78 67

Dr. Eric Novotny
Senior Vice President, US Civilian Research & Development Foundation, 1530 Wilson Boulevard, Third Floor, Arlington, VA 22209
enovotny@crdf.org Tel: 703-526-9720

Ms. Ellen O'Donnell
Office of Strategic Initiatives, Library of Congress, Washington, DC
eodo@loc.gov Tel: 202-707-7391

Dr. Mark Peterson
AAAS Science & Technology Policy Fellow, US Agency for International Development, 1300 Pennsylvania Ave, NW, Washington, DC
mpeterson@usaid.gov Tel: 202.712.0412

Ms. Ana Preston
Executive Director, Internet 2, 1150 18th St, NW, Suite 1020, Washington, DC 20036
apreston@internet2.edu Tel: 202-331-5342

Dr. Joyce Ray (participated in planning meetings, but not the workshop)
Assoc. Deputy Director for Library Services, Institute of Museum and Library Services, 1800 M. St, NW, 9th Floor, Washington, DC 20036-5802
jray@imls.gov Tel: 202-653-4660

Ms. Elida Reci
Governance and Public Administration Officer, United Nations, Department of Economic and Social Affairs, New York, NY
reci@un.org Tel: 917-367-4082

Dr. Vivian Ronay
Photographer, Independent Scholar, PO Box 9627, Washington, DC 20036
Viv@vivianronay.com Tel: 202 362-1460

Mr. Brian Lee Rosenblum
Scholarly Digital Initiatives Librarian, University of Kansas, Center for Digital Scholarship, 1425 Jayhawk Blvd., Lawrence, KS 66045
brianlee@ku.edu Tel: (785) 864-8883

Dr. Julia Royall
Director, International Programs, National Library of Medicine, 8600 Rockville Pike, Bethesda, MD 20894
jroyall@nlm.nih.gov Tel: 301-402-2808

Mr. Richard Sapon-White
Librarian & Head of Cataloging, Oregon State University, Oregon State University Libraries, Corvallis, OR 97331
Richard.Sapon-White@oregonstate.edu Tel: 541-737-7319

Dr. David Schimmelpfennig
Agricultural Economist, US Department of Agriculture, Economic Research Service, 1800 M Street, NW, Room 4179, Washington, DC 20036-5831
des@ers.usda.gov Tel: (202) 694-5507

Mr. Robert (Rob) Schware
Managing Director, Global Learning Portal, Academy for Education Development (AED), Washington, DC
rschware@aed.org Tel: 202-884-8193

Dr. Osman Shinaishin
Senior Program Manger North Africa, Near East and South Asia, National Science Foundation, 4201 Wilson Blvd, Arlington, VA 22230
oshinais@nsf.gov Tel: 703-292-7228

Dr Sarah Shreeves
Associate Professor of Library Research and Publications, University of Illinois--Urbana Champaign, Urbana, IL
sshreeve@illinois.edu Tel: 217-244-3877

Dr. Hanna Szczepanowska
Museum Specialist/Conservator, Smithsonian Institution, 4210 Silver Hill Road, Room E2101, Suitland, MD 20746-2863
szczepanowskah@si.edu Tel: 301-238-1232

Mr. Felix Ubogu
University Librarian, University of the Witwatersrand, Johannesburg, South Africa
Felix.Ubogu@wits.ac.za Tel: +27 11 717 1940

Mr. John Van Oudenaren (participated in the planning, but not the workshop)
Director of World Digital Library Project, Library of Congress, 101 Independence Ave, SE, Washington, DC
jvou@loc.gov Tel: 202-707-4543

Mrs. Patricia Wand
Professor Emeritus from American University, 4854 Bayard Blvd., Bethesda, MD 20816-1785

patwand@mac.com **Tel: 301-229-5609**

Dr. Walt Warnick
Director, Office of Scientific and Technical Information, US Department of Energy, Washington, DC
warnickw@osti.gov **Tel: (301)903-7996**

Ms. Iman Weheba
2010 Fulbright Scholar from Egypt to University of Pittsburgh, Pittsburgh, PA
IAW5@pitt.edu **Tel:**

Ms. Farida Zerari
Coordinatrice des Bibliothèques de l'UMBB, Université M'Hamed Bougara Boumerdes, Boumerdes, Algeria
faridazerari@yahoo.fr **Tel: +213 24 81 34 34**

Attendee List – Workshop on Digital Libraries for the Maghreb

Organized by the Fulbright Academy of Science & Technology
Washington, DC, January 24-25, 2011

The meeting participants listed below are current grantees or alumni of the Fulbright Exchange Program.

First Name	Last Name	Year of scholarship	Host country
Kerry	Adams	1997	Syria
Nicholas	Belkin	2003	Croatia
Marshall	Breeding	2008	Argentina
Alexander	Dehgan	1999	Madagascar
Mary	Downs	1990	Spain
Julie	Egan	2004	Morocco
Charles	Greenberg	2008	Armenia
Louise	Guenther	1995	Brazil
Charles	Henry	2007	China
Eric	Howard	1989	Germany
Khouloud	Khammassi	2007	USA (from Tunisia)
Bill	Lawrence		Tunisia
Kathleen	McCarthy	2004	Armenia
Jamel	Mhedhbi	2009	USA (from Tunisia)
Clifford C.	Missen	1998	Nigeria
Barbara	Moran	2006	Czech Republic
Heather	Moulaison	2008	Morocco
Rim	Nour	2006	USA (from Tunisia)
Elida	Reci	1997	USA (from Albania)
Vivian	Ronay	2007	Egypt
Brian Lee	Rosenblum	2003	Czech Republic
Julia	Royall	2007	Uganda
Richard	Sapon-White	2005	Czech Republic
David	Schimmelpfennig	2002	South Africa
Hanna	Szczepanowska	2000	Egypt
Iman	Weheba	2010	USA (from Egypt)

By leveraging the unique knowledge, experience and contacts of the Fulbright community, the Fulbright Academy of Science & Technology is a catalyst for global research and collaboration/

The Fulbright Academy was established by alumni of the Fulbright Exchange Program and others interested in science and technology innovation. The Academy is an independent, non-partisan membership organization and is not affiliated with the Fulbright program, national alumni groups, or the agencies and commissions involved in administering Fulbright exchanges.

This workshop and other conferences, programs and forums are funded by contributions and memberships from individuals and institutions worldwide and through sponsorships and grants from entities that share our mission.

Digital Library for the Maghreb Workshop

Organized by the Fulbright Academy of Science & Technology
Washington, DC, January 24-25, 2011

THIS LIST IS SOME OF THE INDIVIDUALS WHO WERE INTERESTED IN ATTENDING, BUT DID NOT ATTEND DUE TO TRAVEL ISSUES, ILLNESS, LACK OF ENGLISH LANGUAGE SKILLS, OR OTHER REASONS

Mr. Hassan AAKKI
Ingénieur d'état et chef de la division informatique et numérisation, Bibliothèque Nationale du Royaume du Maroc, Rabat, Morocco
aakkihassan@yahoo.fr Tel: +212 6 66 86 22 41

Ms. Najia Abdallaoui Maan
Deputy Director, School of Information Science, Rabat, Morocco
najia.abdallaoui@gmail.com Tel: (00 212) 5 37 77 49 13

Dr. Noha Adly
ICT & ISIS Director, Bibliotheca Alexandrina, P.O.Box 138, El Shatby, Alexandria, 21526 Egypt
noha.adly@bibalex.org Tel: 20-3-4839999

Dr. Ghada Amer
Deputy CEO, Arab Science & Technology Foundation, PO Box 27272, Sharjah, United Arab Emirates
ghada.amer@astf.net Tel: +2 02 333 65 440

Dr. Farid Amirouche
President, Algerian-American Foundation for Culture, Education, Science and Technology, Chicago, IL
farid.amirouche@gmail.com Tel: (312) 996-3601

Dr. Rafaa Ashamallah Ghobrial
Director, Documentation and Information Centre, Sudan Ministry of Science & Technology, Naitonal Centre for Research, Khartoum, Sudan
rafaasham@yahoo.com Tel: +249-915504104

Néjib Ayachi
Executive Director, The Maghreb Center: Fostering Understanding and Development of the Maghreb, 1933 18th Street. NW, Suite C1, Washington, DC 20009
nayachi@yahoo.com Tel: 202-483-1258

Dr. Nicholas Belkin
Professor II of Information Science, School of Communication and Information, Rutgers: The State University of New Jersey--New Brunswick, New Brunswick, NJ
Belkin@rutgers.edu Tel: 732-932-7500 ext. 8271

Brenda Bickett
Georgetown University Library, Washington, DC 20057-1174
bickettb@georgetown.edu Tel: 202/687-4482

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Mr. Fouad Bouguetta
Head, Interdisciplinary Laboratory for Entrepreneurship, University Badji Mokhtar, Annaba, Algeria
fouad.bouguetta@univ-annaba.org Tel:

Dr. Arun Kumar Chakraborty
Librarian, Bose Institute, P-1/12 CIT Scheme-VII-M, Kankurgachi, Kolkata, 700054 India
akc@bic.boseinst.ernet.in Tel:

Dr. Ching-Chih Chen
Professor Emeritus, Simmons College, 300 The Fenway, Room P-204C, Boston, MA 02115
chingchih.chen@simmons.edu Tel: 617-521-2804

Dr. Guy Cobolet
Chief Librarian, Interuniversity Library of Medicine, Paris, France
guy.cobolet@bium.parisdescartes.fr Tel:

Dr. Greg Cole
Director, GLORIAD - Global Ring Network for Adv.App.Development, University of Tennessee Center for Intl Networking, Knoxville, TN 37966
gcole@gloriad.org Tel: 865-974-2459

Dr. George Coulbourne
Library of Congress, Washington, DC
gcou@loc.gov; eodo@loc.gov Tel:

Ms. Heather Dalterio Joseph
Executive Director, SPARC - Scholarly Publishing & Academic Research Libraries, 21 Dupont Circle, Suite 800, Washinton, DC 20036
heather@arl.org Tel: 202296-2296

Dr. Charlie Dunlap
Digital Library Project, US Civilian Research & Development Foundation, 1530 Wilson Boulevard, Third Floor, Arlington, VA
cdunlap@crdf.org Tel:

Mr. Saf El Mansour
Co-founder and CEO, Shokwav Marketing, Washington, DC
one.saf@gmail.com Tel: 202 664 6432

Mrs. Frehiwot Fekadeselassie
ICADLA Conference Committee, UNECA Library, Addis Ababa, Ethiopia

THIS LIST IS SOME OF THE INDIVIDUALS WHO WERE INTERESTED IN ATTENDING, BUT DID NOT ATTEND DUE TO TRAVEL ISSUES, ILLNESS, LACK OF ENGLISH LANGUAGE SKILLS, OR OTHER REASONS

FFSelassie@uneca.org Tel: 251(11) 5 443058

Ms. Sara Ferchichi
Public Diplomacy Officer for North Africa, US Department of State, Washington, DC
CobbS@state.gov Tel: 202-776-8813

Dr. Glenn Gray
Supervisory Archivist, Joint POW/MIA Accounting Command, Hickham Air Force Base, HI
glnngr@gmail.com Tel:

Dr. Ben Gross
Researcher, Highlands Group, San Francisco, CA
ben@bengross.com Tel: 415-520-7606

Dr. Myron Gutmann
Assistant Director of NSF & Head of Social, Behavioral and Economic Sciences, US National Science Foundation, Arlington, VA
mgutmann@nsf.gov Tel:

Dr. Margaret Hedstrom
Associate Dean for Academic Programs, University of Michigan, School of Information, Ann Arbor, MI
hedstrom@umich.edu Tel: 734-647-3582

Ms. Roxana Henderson
Program Manager, US Department of State/OES, Washington, DC
hendersonrm@state.gov Tel: 202-663-3290

Dr. Charles Henry
President, Council on Library and Information Resources, Washington, DC
chenry@clir.org Tel: (202) 939-4752

Dr. Peter-Paul Henze
Scientific Officer, Consulate General of the Federal Republic of Germany, Three Copley Place, Suite 500, Boston, MA 02116
Tel: (617) 369 4934

Mr. David Hirsch
Libraries Advisor, Abu Dhabi National Library, PO Box 2380, Abu Dhabi, United Arab Emirates
david.hirsch@adach.ae Tel:

THIS LIST IS SOME OF THE INDIVIDUALS WHO WERE INTERESTED IN ATTENDING, BUT DID NOT ATTEND DUE TO TRAVEL ISSUES, ILLNESS, LACK OF ENGLISH LANGUAGE SKILLS, OR OTHER REASONS

Kaye Howe or Susan Van Gundy
Program Managers, National Science Digital Library, Denver, CO
kaye@ucar.edu Tel:

Dr. Mohamed Jerary
Head, Libyan National Archives, Tripoli, Libya
libyanjihad@hotmail.com Tel:

Mamadou Kane
Director, National Museum of Mauritania, Nouackshott, Mauritania
mamadouhadyakane@yahoo.fr Tel:

Dr. Catherine Kerst
Folklife Specialist/Archivist, Library of Congress, American Folklife Center, Washington, DC
cker@loc.gov Tel:

Dr. John Leslie King
Dean and Professor, University of Michigan--Ann Arbor, School of Information, Ann Arbor, MI 48109
jlking@umich.edu Tel:

Dr. Michael Kreyche
Digital Resource Development Specialist, Kent State University, Kent, OH
mkreyche@kent.edu Tel: 330-672-1918

Dr. Ronald Laporte
Professor of Epidemiology, University of Pittsburgh, Pittsburgh, PA
ronaldlaporte@gmail.com Tel:

Ms. Renee Leduc Clarke
Congressional Affairs and Policy Adviser, NOAA, Washington, DC
renee.leduc.clarke@alumni.bates.edu Tel: 2022913351

Dr. Robert Leopold
Director of the Consortium for World Cultures, Smithsonian Institution, SI Building (Castle), Suite 107, 1000 Jefferson Drive, SW, Washington, DC
leopold@si.edu Tel: 202.633.5086

Dr. Claudia Loebbecke
Director, Dept. for Media Management, University of Cologne, Pohligstr 1, Zimmer 214/215, Cologne, 50969 Germany
claudia.loebbecke@uni-koeln.de Tel:

THIS LIST IS SOME OF THE INDIVIDUALS WHO WERE INTERESTED IN ATTENDING, BUT DID NOT ATTEND DUE TO TRAVEL ISSUES, ILLNESS, LACK OF ENGLISH LANGUAGE SKILLS, OR OTHER REASONS

Mr. Haim Malka
Deputy Director and Senior Fellow, Middle East Program, Center for Strategic & International Studies, Washington, DC
hmalka@csis.org Tel: (202) 775-3133

Dr. Gary Marchionini
Professor, University of North Carolina--Chapel Hill, School of Library and Information Science, Chapel Hill, NC
march@ils.unc.edu Tel:

Mr. Michel Merton
Managing Director, memnon audio archiving services, 27 rue du Belvédère, Bruxelles, 1050 Belgium
michel.merten@memnon.be Tel: (32) 2 643 47 77

Mr. Jamel Mhedhbi
Director of Budget and Programs at the Technical Central Direction, Tunisia Telecom, Tunis, Tunisia
jamel.mhedhbi@tunisieftelecom.tn Tel: +216 98 334 202

Dr. Amal Wagih Hamdy Mostafa
Lecturer, Cairo University, Department of Library, Archives and Information, Cairo, Egypt
abam49@gmail.com Tel:

Mr. Kamran Naim
Library Relations Technical Advisor, US Civilian Research & Development Foundation, Arlington, VA
knaim@crdf.org Tel:

Lindy Nhlapo
IFLA Regional Manager for Africa, IFLA Regional Office for Africa,
lnhlapo@unisa.ac.za Tel: +2712 429 6374

Ms. Irene Onyancha
Information Management Specialist/ Librarian, UN Economic Commission for Africa, Addis Ababa, Ethiopia
IOnyancha@uneca.org Tel:

Ms. Lee Pasackow
Business Librarian, Emory University, Business School, Atlanta, GA
Lee_Pasackow@bus.emory.edu Tel: (404) 727-0144

THIS LIST IS SOME OF THE INDIVIDUALS WHO WERE INTERESTED IN ATTENDING, BUT DID NOT ATTEND DUE TO TRAVEL ISSUES, ILLNESS, LACK OF ENGLISH LANGUAGE SKILLS, OR OTHER REASONS

Dr. Christopher Prom
Associate Professor & Assistant University Archivist, University of Illinois--Urbana-Champaign, University Archives Department, 1408 W. Gregory Dr., Urbana, IL 61801
prom@uiuc.edu Tel: 217 333-0798

Mr. Philipe Queau
UNESCO Representative to the Maghreb, UNESCO, 35, avenue du 16 novembre, Rabat, Morocco
p.queau@unesco.org.ma Tel:

Dr. Timothy Reagan
Professor and Chair, University of Connecticut, School of Education & Professional Studies, Storrs, CT 06050
reagantig@ccsu.edu Tel: 860.832.2574

Dr. Bernie Reilly
President, Center for Research Libraries, 6050 S. Kenwood Avenue, Chicago, IL 60637
reilly@crl.edu Tel:

Dr. Karl Schaefer
Professor, Drake University, Cowles Library, Des Moines, IA
karl.schaefer@drake.edu Tel: (515) 271-2924

Ms. Monika Segbert
Member of the eIFL.net Management Board, Electronic Information For Libraries, Italy
monika.segbert@eifl.net Tel: +39 333 4408521

Dr. Margit Smith
Head of Cataloging and Preservation Programs, University of San Diego, Copley Library, San Diego, CA
mjps@sandiego.edu Tel: 619-260-2365

Ms. Joie Springer
Senior Program Specialist, Information Society Division, UNESCO, 1, rue Miollis, Paris, Cedex 15 75732 France
j.springer@unesco.org Tel: +(331) 45 68 44 97

Ms. Stephanie Squires
Associate Program Manager, US Civilian Research & Development Foundation, 1530 Wilson Boulevard, Third Floor, Arlington, VA 22209
ssquires@crdf.org Tel: 703-600-3435

THIS LIST IS SOME OF THE INDIVIDUALS WHO WERE INTERESTED IN ATTENDING, BUT DID NOT ATTEND DUE TO TRAVEL ISSUES, ILLNESS, LACK OF ENGLISH LANGUAGE SKILLS, OR OTHER REASONS

Dr. Umesh Thakkar
US Department of Veterans Affairs, 810 Vermont Avenue NW, Washington, DC 20420
Umesh.Thakkar@va.gov Tel: 202-461-1071

Dr. Charles (Chuck) Thomas
Acting Deputy Director for Library Services, Institute of Museum and Library Services, 1800 M. St, NW, 9th Floor, Washington, DC 20036-5802
CThomas@imls.gov Tel: 202-653-4660

Toong Tjiek Tiauw
Head of Library, Petra Christian University, Jl. Siwalankerto 121-131, Surabaya, 60236 Indonesia
anugraha@peter.petra.ac.id Tel: +62 (31) 298-3210

Dr. Howard Wactlar
Director, Directorate for Computer & Information Science & Engineering, National Science Foundation, 4201 Wilson Boulevard, Arlington, VA 22230
hwactlar@nsf.gov Tel: (703) 292-8900

Dr. Terry Weech
Chair IFLA Education & Training Section, University of Illinois, Grad School of Lib. and Info. Science, 501 E. Daniel St., Champaign, IL 61820
weech@uiuc.edu Tel: 217-333-0646

Mr. Peter Young
Chief, Asian Division, US Library of Congress, Washington, DC
pyou@loc.gov Tel: (202) 707-5919

Dr. Mohsen Youssef
Senior Advisor for Special Projects, Alexandria Library, Alexandria, Egypt
Mohsen.Youssef@bibalex.org Tel:

Metadata for Digital Collections
Bibliotheca Alexandrina's Experience

One of the main issues in designing digital libraries is the association of the digital content with its metadata. This paper briefly describes the methodology of associating metadata to the digital materials available on the Bibliotheca Alexandrina's (BA) Digital Assets Repository (DAR). It illustrates the automatic metadata mapping and cross-walking between the BA catalog (BIBALEX) and DAR.

The metadata standard used in BIBALEX for creating bibliographic records is the Machine Readable Cataloging for 21st century (MARC21) and the metadata standard used on DAR is the Dublin Core. A mapping table between MARC21 and Dublin Core was prepared for automatic mapping of descriptive metadata fields from the BIBALEX to DAR. This automatic mapping requires a unique identifier of the item on BIBALEX, and this unique identifier is the item barcode. The digital materials catalogers create MARC21 records for the item in BIBALEX and then the ICT engineers run software that automatically maps the metadata fields from BIBALEX and associate it with its corresponding digital item on DAR.

Another important issue in designing digital libraries is the integration between digital repositories and Integrated Library Systems (ILS). This integration will allow users to retrieve the materials using one interface, rather than navigating multiple systems and databases to retrieve the same materials which are in different format. Previously, the BA users were able to search and retrieve only the analog version of the item in BIBALEX and need to search DAR to retrieve the digital version of the item. It was suggested that a cross-walking between DAR and BIBALEX is necessary to allow users to retrieve both the analog and digital version of the item from either BIBALEX or DAR. The ICT developed software which automatically adds the URL of the digital version of the item on DAR to the MARC21 record on BIBALEX in the URL field "tag 856". This functionality allows the users to search and retrieve both the analog and digital version of the item from either BIBALEX or DAR.

For more information on the DAR System: http://dar.bibalex.org/webpages/aboutdar.jsf

For searching the DAR: http://dar.bibalex.org/webpages/advancedsearch.jsf

For searching the BIBALEX: http://www.bibalex.org/bacatalog/catalog_en.aspx

White Paper submitted for the Digital Library for the Maghreb Workshop
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Digitizing Brings new Life to Video Collections

Marshall Breeding
Vanderbilt University
Marshall.breeding@vanderbilt.edu

Talk of mass digitization generally brings to mind large-scale projects to scan huge collections of books. The Google Library Print project, the Open Content Alliance, and others have taken on incredibly ambitious projects to digitize enormous numbers of books in some of the world's biggest libraries. Digitization of book collections stands to fundamentally change how individuals find and gain access to the written word. My column for the May 2008 issue of CIL explored the need for deeper search techniques to take advantage of the value of large collections of digitized books. This month, let's take a look at the opportunities made possible through the digitization of multimedia content.

Digitizing brings at least the same level of benefit to other types of collections as we've experienced for books and journals. Therefore, mass digitization needs to address the realms of sight and sound - especially in this age where rich media find a wide and receptive audience on the web. Sites such as Flickr and YouTube exemplify the heightened interest in photos and video. Distribution of digital sound through podcasting has become a routine and expected form of syndicating radio, news, lectures, and other verbal content. Given the current preferences toward rich media content, it seems that libraries should seek out any possibilities for mass digitization of multimedia content in addition to projects related to books and articles.

Vanderbilt Builds a Television News Archive

One of my responsibilities involves administering the Vanderbilt Television News Archive as its executive director. My work with this unit of the library has provided me a great opportunity to apply a variety of technologies to preserve and provide access to a unique and valuable collection and to develop a sustainable business plan.

This archive plays a unique and important role in the arena of national news archiving. Prior to the founding of the Vanderbilt Television News Archive, no comprehensive preservation of national news programming took place. Even the networks themselves didn't keep copies of the newscasts after they were broadcast-the videotapes were erased and reused after a certain period.

Given the importance of the national news in documenting the events of the world for the American public, Paul Simpson, the founder of the Vanderbilt Television News Archive, considered it vital to save these broadcasts for posterity. In the same way that we expect to go to a library to read previous issues of newspapers going back through history, it's also important to view news broadcasts of times past. Imagine a world where at the end of the day all newspapers were collected and shredded. Without our archive, many national television news broadcasts would have disappeared after their initial broadcast. A great deal of the national news broadcasts prior to when we began recording are unfortunately lost.

The Vanderbilt Television News Archive systematically records, pre- serves, and provides access to news pro- gramming of the U.S. national televi- sion networks and ranks as the largest and most comprehensive archive of its kind. Its collection includes a comprehensive run of the evening news pro- grams of ABC, CBS, and NBC since Aug. 5, 1968, an hour per day of CNN since 1995, and an hour of Fox News daily since 2004. In addition to the evening news programs, a collection of special news programs includes a variety of other events covered on the national news - presidential speeches, election coverage, political conven- tions, major wars, and other major events. Some of the highlights of the collection of news specials include coverage of the Watergate hearings, the State of the Union and other major presidential speeches, the Gulf War, continuous coverage of the events of 9/11, and the wars in Afghanistan and Iraq. Between the evening news and the special collections, the material recorded accumulates to more than 40,000 hours of video content. And what started out as a 3-month experiment to demonstrate the viability of creating a library of television news has managed to survive 4 decades, despite incredible technical, legal, and financial challenges.

In the 1970s, the archive faced its greatest legal crisis when one of the networks filed a lawsuit claiming violation of its copyright. Archiving television content involves complex intellectual property issues. The original networks clearly own the content, but what rights does a third party, such as our archive, have to record, preserve, and provide access to that content? The networks claimed exclusive access. But it also seemed unfortunate for the public to be denied access. A revision of the U.S. copyright law was already underway in 1974 at the time of the lawsuit. Sen. Howard Baker introduced a statute that provided an exemption allowing libraries to make recordings of televised news programs and to loan them to the public. When the new copyright law that included this "Vanderbilt clause" went into effect in 1976, both parties withdrew from the lawsuit.

Financial issues also threatened the archive. Operating an off-air television archive requires considerable staff, recording equipment, and media. On more than one occasion, the archive faced threats of closure due to high costs of operation and limited possibilities for income.

Digitizing the Vanderbilt Television News Archive

For the last 5 years, we've been working hard at the Vanderbilt Television News Archive to digitize our collection of national news broadcasts. In 2002, the National Science Foundation (NSF) funded a 1-year project to explore technologies and methodologies that could be applied to begin recording newscasts digitally and to digitize our existing videotape collection. We put these technologies to work right away. In 2003, we switched our off-air recording from U-Matic videotape to MPEG-2 digital files. The National Endowment for the Humanities (NEH) provided support for a 2-year project, beginning in 2004, to digitize our collection of more than 30,000 evening news programs. Once that effort was completed in 2006, we commenced digitizing our collection of specials, also with funding from the NEH. That project ended in August 2008, resulting in a fully digitized collection of about 40,000 hours of video content.

Digitizing this collection presented a number of challenges spanning issues including technical standards, metadata, storage capacity, digital preservation, and equipment maintenance. During the NSF grant phase, we selected the standards, profiles, and practices that have been used subsequently. In the digital video arena, one of the key trade-offs involves balancing compression against file size. With our collection of off-air recordings, the already compromised quality of the original material allows us to use more aggressive compression without perceptible degradation. For those with an interest, we settled on an MPEG-2 profile with compression to a 6-MB/sec. bitrate.

This project involved a constant battle with bandwidth and storage. The digital files produced required about 3GB of storage per hour of content, which, when you consider we are dealing with 40,000 hours of content, requires about 120 terabytes of storage. Our storage strategy involved making a copy of each MPEG-2 file on DVD for our local working collection, sending a copy to the Library of Congress for long-term preservation, and rendering a copy in RealMedia at a lower bitrate and smaller screen resolution for access through our cluster of streaming servers. Moving these files produced considerable strain on our local networks and, at least initially, defied the use of the internet for transfer to the Library of Congress. During the first grant project, we physically shipped files on 500GB drives. We were able to bypass physical shipping during the second project and made use of the higher bandwidth available through Internet2 to transport the files.

In order to process this quantity of material, we had to implement efficient workflows to process the collection in the allotted time frame and budget. Whenever possible, we created software tools to automate routine tasks. These tools avoided manual handling of files, allowing operators to submit each digitized MPEG-2 file through a web interface. This initiated a process that copied it to an intermediate storage server, transcoded it into RealMedia format, and deposited it onto the streaming media server cluster. Even though we automated processes where we could, the project still involved an incredible amount of hands-on work, requiring about five full-time personnel in addition to regular staff of the archive.

Benefits of Digitization

The transition to a digital collection has presented the Vanderbilt Television News Archive with many advantages not available when it was tied to a physical videotape collection, especially in the ways that we are able to provide access to the collection. When the collection resided on videotape, the two options for access were on-site viewing and making copies to ship to those that made requests for material on loan. The loan service included making copies of either whole programs or compilations of selected segments onto a videotape mailed to the individual making the request. We charged service fees to offset the expense of providing the service.

As the collection shifted from videotape to digital formats, we gained a lot of efficiency in the loan service. Not only were we able to move from VHS videotape to DVD, but the process of making the compilations and duplications can be done much more quickly when working from digital files instead of having to retrieve physical tapes.

The ability to deliver access to the collection through streaming video opens up opportunities that would have never been possible with the videotape collection. For visitors on-site within our library and in the archive's offices, we allow immediate viewing of the entire collection through streaming video. Unfortunately, limits on copyright preclude providing streaming video access to the general public throughout the web. That is because the exemption that gives us the ability to loan physical copies of materials does not apply to streaming without the explicit permission of the originating network as the primary copyright holder. We have, however, worked out agreements with two of the networks represented in our collection to provide streaming access of their content to colleges and universities based in the U.S. and Canada.

These agreements provide the basis for a subscription product that we offer to eligible institutions. This resource includes full access to our database of more than 880,000 abstracts and catalog records that describe the collection, with direct links to the streaming video for authorized networks. We offer these subscriptions at an annual fee, which contributes toward the operational expenses of the archive. This is one way in which shifting to digital technologies has improved the financial environment. We're working hard to increase the number of institutional subscribers to help us further improve the financial support of the archive.

A Promising Future

Even though we have already seen great benefits from digitizing our collection of news broadcasts, I think that we have by no means exhausted the advantages enabled by the technology. Other possibilities include finding ways to provide deeper search capabilities for the content. While technology cannot resolve the copyright issues that prevent us from opening up the content to the world, it can help us increase the impact and value of the collection and further strengthen the sustainability of the operation to allow it to continue for another 40 years and beyond.

When we began our efforts to digitize the collection 5 years ago, we faced many challenges that have moderated over that time. Costs related to storage, bandwidth, and equipment have since dropped significantly. Interest and use of video and other multimedia content has risen explosively. These factors not only make multimedia digitization projects more affordable and practical to achieve but point to the importance of expanding library collections with content rich with video, images, and sound.

[This essay was originally published in the October 2008 issue of Computers in Libraries.]

White Paper submitted for the Digital Library for the Maghreb Workshop
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Exploring Creative Collaborations in Advanced Digital Technologies

George Coulbourne
Office of Strategic Initiatives
Library of Congress
gcou@loc.gov

The Library of Congress is recognized as the U.S. national library, the oldest Federal cultural institution (founded in 1800), and the research arm of the U.S. Congress. The Library seeks to spark imagination and creativity and to further human understanding and wisdom by providing access to knowledge through its rich collections, programs, and exhibitions.

Many of the Library's activities address the challenges and opportunities of exploding digital technology and the Web. Thus, the Library is engaged in a variety of projects relevant to digital libraries and digital preservation, in the U.S. and worldwide. Employment of partnerships, collaborations, and advanced technologies (such as x-ray fluorescence and multispectral imaging) are among the approaches being used to uncover and preserve, including in digitized formats, treasures of cultural and scholarly heritage.

This paper focuses on two projects in the Library's Office of Strategic Initiatives (OSI) and their relevance to the topic of digital libraries for the North Africa/Maghreb region. The Office supports the Library's mission by directing the national program for long-term preservation of digital cultural assets, leading a collaborative institution-wide effort to develop consolidated plans for our digital future, and integrating the delivery of information technology services. Cooperation and/or collaboration with external partners is crucial for OSI to help meet these challenges as well as the partners' common goals.

Advancing Digital Preservation

The Office's activities relevant to digital preservation include:

- Collecting digital content
- Developing tools and services to create the technical architecture needed
- Establishing standards, guidelines, and best practices to help ensure preservation
- Building a network of collaborative partners whose work benefits the entire digital preservation community.

OSI staff also work internally to preserve and access digital content, e.g., through development of improved metadata, and new tools to transfer large quantities of digital content.

Increased connectivity in communications and technology is creating new opportunities for collaborative efforts across disciplines, stakeholder groups, and global user communities. Thus, OSI is the home of several programs utilizing partnerships in advanced digital technologies.

The Digital Preservation Outreach and Education (DPOE) initiative was launched in January 2010. DPOE fosters national outreach and education in digital preservation and encourages individuals and organizations to actively preserve their digital content. A collaborative network of instructors, contributors, and institutional partners is central to DPOE endeavors. DPOE's recent activities include the following:

- Staff are building an online calendar of U.S. digital-preservation education and training opportunities, to serve as a central hub for training providers and seekers (expected launch in spring 2011). OSI has made an agreement to share these listings with the Digital Curation Center, based in the United Kingdom, and by extension to an international calendar linked to the JISC's KeepIT project.
- In fall 2010, DPOE staff conducted a national survey of the current state of digital preservation in the United States; an executive summary is on the DPOE Web site.
- A national steering committee for DPOE has been formed.
- A curriculum review of digital preservation training classes is being conducted.
- One or more grant applications with partners, in support of digital preservation networking and activities, will be submitted in 2011.

DPOE staff note that any discussion of digital preservation at the international level must include consideration of infrastructure. In many developing countries, there is little wired infrastructure for digital communications; instead, people use mobile phones. In 2009, the number of mobile phones reached 4.6 billion, according to the International Telecommunication Union (ITU), a United Nations agency. Mobile cellular penetration in developing countries passed over the 50 per cent mark, to 57 per 100 inhabitants. Although this figure is well below the average figure for developed countries, the ITU terms this rate of progress "remarkable" at more than double the figure for 2005 (23 percent). Among the developing regions, Africa, in recent years, has had the highest growth rate in mobile cellular penetration, which is now at over one-quarter of the population compared with 1 in 50 people a decade ago.

A small percentage of mobiles being used, according to DPOE staff, are smartphones, but this number will grow as technology matures. They add that any efforts for digital preservation in areas that rely heavily or exclusively on mobile phone communications must take into consideration not only bandwidth and access requirements (for example, Flash sites will not run on some smartphones) but what types of practices could be put into place to capture and preserve data stored on smartphones.

Internships for Education and Training

OSI has an active interest in educating and collaborating with scholars from all aspects of the digital technology community. One way in which it accomplishes this goal is through internships. In addition to hosting interns in OSI from various programs inside and outside the Library, OSI is seeking to partner with external organizations in the public and private sectors to advance the field of internships in digital technologies, including in digital preservation, as they are applied in library, archival and museum settings.

OSI is actively seeking to create and host a pioneering, national-level internship program that would provide specialized skills and experience in advanced digital technologies to a select group of graduate students. As conceived, this program could potentially include an international field experience in one or more regions, such as the Maghreb. Among the benefits from an international component, OSI believes, would be to:

- Offer interns a comprehensive experience, including through exposure to the international community
- Build understanding of global challenges in a diverse society
- Provide the tools necessary to implement change
- Help participants understand the needs of developing countries as those countries work to address issues of digital technologies and cultural heritage in their overall strategic development
- Train a corps of professionals equipped to collaborate on projects in one or more world regions
- Help to bridge the gaps between disciplines, e.g., between library and information science, information technology, digital preservation, archival science, museum studies, public policy, and other disciplines
- Advance diversity, including through:
    - Marketing the program to networks and cultural heritage institutions oriented to historically minority populations
    - Increasing the diversity of the corps of professionals in the field of digital technologies as they apply to libraries, archives, museums, and other cultural heritage institutions.

Participants in and graduates of this kind of international field experience would be assets to organizational mission, e.g., through developing physical infrastructure needs, supporting education and training in the host country (including training of informationists), and facilitating dialogue and exchange.

This concept, OSI believes, could lend itself to a partnership with one or more agencies (possibly with established relationships in the international arena) to place the interns in the public and private sectors. OSI will be further exploring this idea.

A representative example of an OSI creative collaboration is work with the Association for Library and Information Science Education (ALISE), a nonprofit organization for university faculty in graduate programs in library and information science in North America. ALISE’s assets include expertise in scholarship in library and information science as well as a robust academic network, and OSI offers expertise in digital preservation with a wide-ranging network. Specific activities are under discussion.

In conclusion, the Library of Congress OSI seeks new ways to use new technologies and to cooperate or collaborate with institutional partners that have similar interests. One relevant area is dialogue and exchange with persons and organizations interested in digital technologies, digital preservation, and cultural heritage issues worldwide. With respect to the Maghreb region, OSI can foresee potential benefits from a more robust infrastructure in and engagement with this region, including with its significant cultural heritage.

For More Information

Library of Congress:

- Web site: www.loc.gov
- Web site personalized to users: www.myLOC.gov
- *The Library of Congress Strategic Plan: Fiscal Years 2008—2016*: http://www.loc.gov/about/mission.html
- *Office of Strategic Initiatives Strategic Plan FY 2008-2013*: http://staff.loc.gov/sites/osi/about-3/strategic_plan/
- Digital Preservation and Outreach Education initiative: http://www.digitalpreservation.gov/education/index.html

Association for Library and Information Science Education: www.alise.org

International Telecommunications Union, *Measuring the Information Society 2010*: http://www.itu.int/ITU-D/ict/publications/idi/2010/index.html.

Boosting Cultural Heritage Online

European Commission
Press release: IP/10/456
21 April 2010

Note from Workshop Organizer – this European Commission project might be a model for activities in Africa. A 'Comité des Sages' report is due to be published early in 2011.

Digital Agenda: Europeana gives online access to over 14 million examples of Europe's cultural heritage

Anyone in the world can now access over 14 million digitised books, maps, photographs, paintings, film and music clips from cultural institutions across Europe through Europe's digital library Europeana. Launched in 2008 with two million objects, Europeana has already passed the initial target for 2010 of 10 million objects. Today, the Reflection Group ("Comité des Sages" - Maurice Lévy, Elisabeth Niggemann, Jacques de Decker) set up by the Commission to explore new ways to bring Europe's cultural heritage online (IP/10/456) is addressing the EU's Council of Culture Ministers and the European Parliament's Committee on Culture. The Comité des Sages' report is due to be published at the beginning of 2011.

Neelie Kroes, Vice President of the European Commission for the Digital Agenda said: "Europeana is a great example of how cooperation at European level can enrich all of our lives. 14 million objects available online is good news for all internet users who want to have access to cultural material from Europe's libraries, museums and archives. But Europeana could be even better if more cultural institutions digitised their collections and made them accessible through this European portal. I trust the *Comité des Sages* will soon give us ambitious recommendations to speed up that process."

Europeana was launched as a prototype in November 2008 as Europe's gateway to allow internet users to search and get direct access to digitised books, maps, paintings, newspapers, photographs, film fragments and all sorts of audiovisual documents from Europe's cultural institutions. More than 14 million of these items, along with music clips, are now accessible through www.Europeana.eu, well above the Commission's initial target of 10 million works for 2010.

New items added this year include a Bulgarian parchment manuscript from 1221 witnessing to history of the Bulgarian language; 'Catechismusa prasty szadei', the first Lithuanian book, published in 1547; a 1588 copy of Aristotle's' Technē rētorikēs in ancient Greek and Latin; paintings by the 17th century Dutch painter Jan Steen; the complete works of German authors Goethe and Schiller; 1907 footage of festivities for the Danish Constitution Day; and a series of pre-World War I photographs of the Glendalough monastery in Ireland (see MEMO/10/586) for more examples).

Digitised photographs, maps, paintings, museum objects and other images make up 64% of the Europeana collection. 34% of the collection is dedicated to digitised texts, including more than 1.2 million complete books that can be viewed online and/or downloaded. The texts cover thousands of rare manuscripts and the earliest printed books (incunabula) from before 1500. Video and sound material represents less than 2% of the collections. Much of the material accessible through Europeana is older, i.e. out of copyright, items, due mainly to the difficulties and cost of rights clearance to digitise and give access to in-copyright material (even for material that is no longer commercially distributed or out-of-print) or material whose potential right-holders are unknown (orphan works).

All EU Member States have contributed items to Europeana, but input is still uneven. France is still the largest contributor (18% of total items). Germany has increased its share to 17%. To ensure Europeana represents a true cross-section of Europe's cultural heritage, it needs further quality material from all Member States.

The potential for using Europeana in schools was demonstrated by entrants in the recent eLearning Awards organised by European Schoolnet. The winning project, fromPortmarnock Community School in Ireland involved pupils creating their own blogs about figures from history using digital resources.

Next year Europeana intends to experiment with user-generated content and will invite users to contribute material to Europeana around the theme of World War I.

Currently, Europeana has two virtual exhibitions running. 'Reading Europe' presents a rich choice from Europe's rare books and literary works. The 'art nouveau' exhibition shows the potential of bringing together cultural material from different countries.

Background

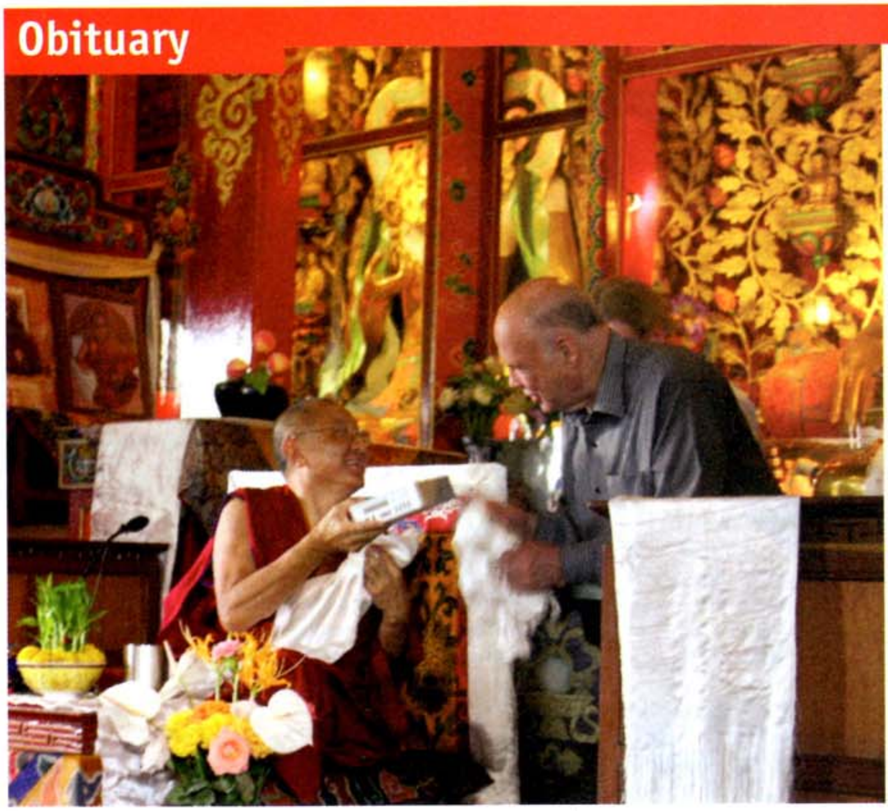
Europeana www.europeana.eu is a collaborative endeavour of Europe's cultural institutions. Over 1500 cultural institutions from across Europe are contributing digitised material. It was launched as a prototype, in November 2008 and initially it had 2 million cultural objects available online (IP/08/1747).

The Europeana office is hosted by the National Library of the Netherlands in Den Haag. It is run by the Europeana Foundation and is 80% financed by the EU. At its launch in 2008 it was overwhelmed by the unexpected user interest and had to close for a month.

See MEMO/10/586 for more information about Europeana.

Europeana content by country
(percentage of the total number of objects in Europeana contributed by different countries)

EU Member States	**Percentage**
France	17.98%
Germany	17.10%
Sweden	9.69%
Spain	8.85%
The Netherlands	7.89%
Italy	7.03%
Ireland	6.47%
United Kingdom	6.14%
Poland	2.81%
Belgium	1.45%
Greece	1.40%
Finland	1.31%
Slovenia	0.98%
Austria	0.32%
Estonia	0.27%
Romania	0.17%
Slovakia	0.15%
Denmark	0.11%
Portugal	0.11%
Bulgaria	0.08%
Czech Republic	0.08%
Hungary	0.07%
Lithuania	0.05%
Luxembourg	0.04%
Latvia	0.01%
Cyprus	<0.01%
Malta	<0.01%
European collections without an attribution per MS, e.g. from European projects	2.91%
Non-EU countries	
Norway	5.76%
Others	0.85%



Gene Smith

Gene Smith, librarian and Tibetologist, died on December 16th, aged 74

WHEN he visited the monastery of Menri, in the foothills of the Himalayas, in 2008, Gene Smith took a tiny gift for the abbot. He told him to wear it as an amulet round his neck, to ensure that all was well. Menri Trizan sports it today with his crimson robes: a memory stick, containing hundreds of pages of Buddhist scriptures.

At other monasteries, up and down the remote hillsides and the steep valleys, Mr Smith made a present of portable hard drives. A bulky, jacketed figure among the swarms of shaven heads, making an untidy *namaste* with his chunky Western fingers, he handed over devices, no bigger than the palm of a hand, which contained 10,000 books. Where for centuries monks lifted their *pecha* texts from decorated bookshelves and read the loose leaves across their knees, they now stare into laptops, contemplating the works Mr Smith has scanned for them.

Some might sigh over the intrusion of the modern world. Not Mr Smith. He first went to India, a student seeking rare Tibetan books, not many years after Tibet's uprising against the Chinese occupiers in 1959, when the country's monasteries—in effect, its libraries—were ransacked and destroyed. Not only books were burned, but also the carved wooden blocks from which they were printed. Fleeing Tibetans tried to save the texts, the repositories of 1,500 years of thought and prayer, by trussing them on yaks, but the loads often fell into rivers and ravines. They strapped books on their own backs; but when they arrived in exile the corpus was scattered and damaged, and much of it lost.

Over five decades, Mr Smith made it his business to put Tibetan literature back together. He did it more or less single-handedly, fired by his love of the language and the culture and aided by a brain that rapidly became an encyclopedia of lineages, sutras, lives of lamas, and the history and ownership of every book he came across. Expatiating in serene but fearsome detail to friends in his rooms in Delhi, or Boston, or New York, all of them piled floor-to-ceiling with cloth-wrapped *pecha*, he could instantly find a page anywhere to illustrate a point. Though people considered him a teacher, he was always a librarian, with a librarian's love of catalogues and connections; but his Buddhism added to that a reverence for the transmission of texts, on which all spiritual progress rested.

He found two ways to save the books, both ingenious. First, for 20 years, he used a food-aid programme called Public Law 480, under which America sold surplus wheat to third-world countries and then used the local-currency payments for humanitarian ventures. Mr Smith, working after 1968 as a field officer in India for the Library of Congress, reckoned his mandate under PL480 extended to buying books. Armed only with fistfuls of rupees and with letters of introduction from his Tibetan teacher, Deshung Rinpoche, to various lamas, he trawled through Indian libraries and then travelled into the hills. There, though still fearful of exposing their treasures, exiled Tibetan monks showed him the texts they had; and, with the money he gave them, printed more. In the end the PL480 programme saved 8,000 books, each of which was printed in 20 or so copies for American centres of research.

Yet all this depended on Mr Smith's encyclopedic knowledge to find, assess and edit the books; and, as time went on, digital technology proved even more efficient. In 1999 Mr Smith set up the Tibetan Buddhist Resource Centre, first in Boston and then in New York, and set about putting his 12,000-volume collection, the largest anywhere, online. By his death he and his team had scanned 7m pages of text and had made CDs of files, such as the 110-volume *kangyur*, or teachings of the Buddha, which were too huge to download. As for the books themselves, he left them to a university in China: the place where, despite everything, he felt Tibetan Buddhism would eventually flourish again.

Did he ever suppose, he was asked once, that he would spend most of his life immersed in Buddhist *dharma*? He replied, "Sure." It was by no means so sure when he was born, in Ogden, Utah, into a Mormon family distantly linked to Joseph Smith, the founder. His connection with Utah soon faded, however, as he studied Sanskrit and Tibetan and became a Buddhist under Deshung Rinpoche's influence. Though he was never a monk, there was a monkish look about him: the balding head, the frank, kindly eyes, the life spent in rigorous discipline among ancient texts. Friends noticed, too, his fascination with *terma*, tiny texts in shell-like casings that were buried and dug up again to speak wisdom to later generations, and drew joking parallels with Joseph Smith's discovery of the Mormon golden tablets.

The porcelain cup

Amid the extraordinary complexity of his chosen subject, Mr Smith kept a childlike simplicity. He did not talk about himself or what he believed in, save books. He was sceptical of the reincarnation-claims of some of the lamas and tulkus he met. But he was deeply moved when he gave one child lama a precious porcelain cup that had been used by Deshung Rinpoche, and found that the child recognised it as his own. In such small things he placed his faith; as in a memory stick, worn round the neck, preserving everything. ■

White Paper submitted for the Digital Library for the Maghreb Workshop
Held in Washington, DC, January 24-25, 2011

Digitalization of University Publications in the Maghreb countries

Mrs Fatma ELKORY OUMRANE
University of Nouakchott
felkory@yahoo.fr

Introduction :

First of all, allow me to highlight and encourage the enthusiasm of the Government of the United States of America through its institutions and resource persons attending this Washington meeting, for their contribution to set up a concrete and sincere line of reflection and actions which will advance the implementation of this eagerly desired digital library for the Maghreb.

This library is needed by institutions such as the University of Nouakchott which are ready to do everything they can for the success of this project to which they immediately subscribed for the multiple positive impacts they can draw from it:

- Visibility / accessibility of university production,
- Building up staff capacities,
- Expansion and building up of partnerships
- Etc.

Background:

Without getting into provocative discussions on technical or mainly political difficulties that usually appear in the establishment of such a research and information tool, I will simply say that the Maghreb digital library must meet specific needs in relation to the limited financial and technical means of our countries, to the very wide areas and great distances which mark our relief and environments and finally respond to specific needs of our community of life that wishes like any other group, to start thinking of pooling our efforts (within the Maghreb Union), to use our time in a more profitable way and strengthen our synergies.

It is, I believe, this wider vision (north-south-north) which today makes us rethink our existing information patterns and reflect on others that are more adequate because they are more modern and more accessible.

Presentation:

As during the workshop of Rabat in January, 2007, my presentation will still be centred on the need, the importance and the urgency of digitalizing the outputs of Maghreb universities, particularly dissertations and theses to make them more exploitable, more useful everywhere and for everyone.

Indeed, termed usually as grey literature, this production is becoming more and more important and more and more relevant, but remains more and more badly organized, run, and thus poorly known.

Yet it represents an information source with a particular interest because it covers a large variety of fields of study which are often peculiar to the geographical area they are drawn from, and hence deserve to be accessed by the widest audience possible.

In addition, I believe that the integration of this production to the project of implementing a sub-regional digital library would be more than beneficial. On the one hand, the researchers in these countries will take advantage of the tool but also other researchers coming from elsewhere. On the other hand, it would give to this electronic library a wider dimension with a universal access to knowledge, in particular that of our countries and our partners (United States, Europe…).

The digitalization will have among other advantages to:

- Know what has been done in such or such domain and avoid duplication in term of efforts as well as technical and financial means;
- Foster a wider pooling of university works and their sub-regional sharing;
- Save money intended to study / research trips which cannot be offered by most of our universities to their researchers. Often they randomly make these trips at the risk of finding nothing, because they are poorly counselled and informed;
- Create more synergies between the researchers and the various departments of the various universities in the Maghreb area (to initiate /complete such or such research and\or give it a more sub regional or global nature etc.;
- Create an information platform for the Maghreb, to meet the needs of thousands or even millions of foreign researchers, who are interested in the region and in the works the academics dedicate to it;
- Fill in the gap within the "Maghreb" area often apparent within the big research, information and communication spaces and tools.

Furthermore, allow me to recommend the promotion of the following sectors:

- Training of professionals in information management, in partnership with existing institutions;
- Support the teaching and training institutions in the field of information management (improvement / modernization of educational contents, foster exchanges between teachers in the region);
- Promote exchanges between the various institutions producing information outputs (statistics, research and study institutions, media);

Conclusion :

To sum up, I would like to insist on the need to put certain thematic collections of this Maghreb digital library in the form of CD-rom or portable hard drives to resolve common problems of access / accessibility to Internet and, thus increase access and operation opportunities of such a tool by individuals in rural areas and other audiences such as NGOs.

ketabook.com
maghreb bookstore

One small step toward the digitization of the librarian's bibliographical data

Ketabook.com celebrates ten years of serving the academic and research community in 2011. As the first Maghribi online bookstore, it has brought something new to the book landscape in North Africa. For university librarians around the world Ketabook has become a useful resource to know what is published in Morocco. Our quarterly newsletter reaches more than 200 librarians in the US, Europe, and Asia. Gradually, our new blog, facebook, and twitter posts are replacing the traditional one-way communication to create an exchange platform for librarians and academics.

Ketabook seeks to overcome one major handicap that faces small publishers in the region: that of distribution. Many authors in Morocco and the rest of the Maghrib have their works published through their own means without passing by an established publisher. Many works are also published outside the major academic centers, in Tetouan, Marrakesh, or Oujda for instance. Our goal is to bring such works to the attention of the academic reader, through our website and through our blog.

Ketabook is particularly concerned about research and the needs of researchers. For this purpose we are offering a free of charge consultancy service by renowned Moroccan specialists in history, anthropology and other disciplines. This service helps doctoral students identify the necessary documentation and helps librarians fill in the gaps in their collections (periodicals or otherwise). We have been particularly attentive to indexes of theses published about Morocco both within and outside of the country. We have also listed in our online data all the manuscript catalogs that have been published about the different manuscript funds of Morocco.

Beyond books, Ketabook has been providing products digitally published in Morocco for some time now, and we are looking forward to helping in future efforts to digitize and distribute knowledge from our region of the world. Here are some examples:

- Digital general bibliography of the Maghreb (Maghrib Index), with more than 100,000 titles.
- Digital reproduction the whole collection of Da'wat Al Haq, the number one journal of Islamic studies in Morocco (1957- present).
- Digital listing the doctoral dissertations in the social sciences defended in Moroccan universities since 1956.
- Digital records detailing the cultural heritage of many old cities such as Tetouan, Salé, Chefchaouen etc.

EU Culture Council & Digital Agenda

European Commission
Results of Meeting
18 November 2010

Note from Workshop Organizer – this European Commission project might be a model for activities in Africa.

Results of EU Culture Council, Brussels, 18 November

Androulla Vassiliou, the European Commissioner for Education, Culture, Multilingualism and Youth, warmly welcomed the adoption by the EU's Council of Culture Ministers of the EU Culture work plan for 2011-2014. For her part, Neelie Kroes, Commission Vice-President for the Digital Agenda, underlined to Ministers the very considerable opportunities new technologies can bring to the creative and content industries, as identified in the Digital Agenda for Europe. The Reflection Group ('Comité des Sages') on bringing Europe's cultural heritage online, who are due to finalise their report at the beginning of 2011, held an exchange of views over lunch with Ministers, Commissioner Vassiliou and Vice-President Kroes. The Council adopted conclusions on European film heritage, on European cinema in the digital era and on the role of culture in combating poverty and social exclusion.

Culture Work Plan

Commissioner Vassiliou underlined that the EU Culture work plan for 2011-2014 adopted by the Council will, "together with our agenda on culture, form the basis for our future work. This plan will focus on strengthening the capacity of the cultural and creative sector and making the most of culture's rich contribution to European economy and society. Combined efforts by Member States and the Commission are essential if the full potential of the work plan is to be reached."

Mons designated European Capital of Culture

Commissioner Vassiliou congratulated Mons on its designation as European Capital of Culture in 2015. "The European Capitals of Culture are a unique opportunity for cities to reap benefits in cultural, social and economic terms and to raise their visibility and profile on an international scale", she commented.

Digital Agenda

Vice-President Kroes and Commissioner Vassiliou addressed the priority actions identified by the EU's Digital Agenda for Europe
(see IP/10/581 MEMO/10/199 andMEMO/10/200) to help the cultural and audiovisual sectors in Europe seize the opportunities of new technologies. They urged Ministers to support specific actions on Intellectual Property Rights, including collective rights management and solutions to orphan works, online distribution of audiovisual works and other creative content, the promotion of cultural and creative industries and the

digitisation of cinema. Commissioner Vassiliou underlined that "Digital technologies have an important role to play in increasing the competitiveness of the European film industry".

Vice-President Kroes stressed that "the digital age is not a threat for culture and creation, but rather an opportunity" and appealed to Ministers to actively support the implementation of the Digital Agenda in all its aspects. Kroes gave the example of the roll-out of broadband networks for all by 2013 and of fast and ultrafast broadband by 2020 (see IP/10/1142), which inter alia requires that there is sufficient radio spectrum made available for wireless broadband (see MEMO/10/425). "Broadband will open up tremendous new opportunities for the distribution of cultural and audiovisual works to the benefit of Europe's citizens, artists and authors", Kroes stressed.

Cinema

The Council adopted conclusions endorsing the Commission's recent papers on the opportunities and challenges for **European Cinema** (IP/10/1168) and on **European film heritage**, including the challenges of the digital era (IP/10/894). Commissioner Vassiliou thanked Member States and the Belgian Presidency for their support for the Commission's policy on **digitisation** of cinema, in particular the €4 million support mechanism foreseen within the MEDIA programme that will start in 2011. Vassiliou also urged Member States to use the EU's Structural Funds to the full for this purpose. Vice-President Kroes welcomed the Council conclusions "because to build a rich film heritage for this and future generations, our cultural institutions need money and they need a favourable legal framework". Kroes underlined to Ministers that the rules must be clarified to bring this legal certainty and that "Member States must work to ensure that film heritage is fully integrated in their film policy and that cultural and educational uses are facilitated for funded films at regional and national level."

Digitisation

The Reflection Group ('Comité des Sages') on bringing Europe's cultural heritage online, set up in April 2010 (IP/10/456), briefed Ministers, Commissioner Vassiliou and Commission Vice-President Kroes about the work it has done so far, including the results of the public consultation which ran between August and September 2010 (IP/10/1055) and the public hearing which took place on 28 October 2010. There are still serious legal obstacles that stand in the way of more widespread digitisation of works, not just for material that is still in copyright, but also for the so-called orphan works (whose right holders are unknown). The report is due at the beginning of 2011.

Kroes commented "Digitising, making available online and preserving our cultural heritage, is a huge challenge for our times. One key instrument to reach this goal is to continue our collective support to the European portal Europeana, the web portal of Europe's libraries, museums and archives." Kroes urged the 'Comité des Sages' to come up with ambitious recommendations to, inter alia, make it easier for cultural institutions to digitise their collections and give access to them through Europeana (seeIP/10/1524 and MEMO/10/586). Commissioner Vassiliou noted that "there must be a good balance between giving full access for citizens to cultural content and the need to protect the rights of the creators".

Role of culture in combating poverty and social exclusion

The Council adopted conclusions that highlight the enormous social and economic benefits of culture-based projects. Commissioner Vassiliou commented that "These projects encourage collaboration across policy borders and I urged Member States and regions to incorporate culture into their social cohesion strategies. I am convinced that these conclusions will become a key reference for future initiatives on mobilising culture as a resource to fight against social inequality."

European Heritage Label

The Council took stock of progress report on establishing the European Heritage Label as an EU initiative. The label would set up an independent panel to select sites that celebrate and symbolize European integration, ideals and history. It is hoped the new-look label will come into effect in 2011 or 2012 (see IP/10/250). Commissioner Vassiliou commented "I am confident that the Label will be a reality very soon and will play a key role in safeguarding our heritage."

To find out more:

Website of Androulla Vassiliou, Commissioner for Education, Culture, Multilingualism and Youth.

Website of Neelie Kroes, European Commission Vice-President for the Digital Agenda

White Paper submitted for the Digital Library for the Maghreb Workshop
Held in Washington, DC, January 24-25, 2011

Experience of Algeria in Developing Libraries

Zerari Farida
Coordinator of **UMBB** Libraries
Co-biblio@umbb.dz
faridazerari@yahoo.fr
Noreddine Meftouh
Responsible of **CERIST** library
nmeftouh@mail.cerist.dz

The **Democratic and Popular Republic of Algeria** is a country in North Africa. In terms of land area, it is the largest country on the Mediterranean Sea and the second largest on the Africa continent and the eleventh-largest country in the world with an area of **2,381,741** km ^{2}; it has a population of **34,178,188** inhabitants.

➢ Algerian Universities:

Algeria has 84 academic training institutions including:
36 Universities, 15 University centers, 16 National higher schools, 05 Higher Colleges, 10 Prep Schools and 02 integrated preparatory schools. The number of students is 1,200,000. There are no fees for studies; all is free. 35 000 permanent teachers.
Our General Directorate of Scientific Research and Technological Development includes: 10 Centers of research, 05 unities of research, 03 Research Agencies and 931 Approved Research Laboratories.

➢ The strategy E-Algeria 2013:

In order to catch up in terms of digital divide, a multisectoral plan called "Strategy E-Algeria 2013" was developed to establish an introduction at all levels of information and communication.
This strategy is evidenced by several points or more strategic. It may be noted, among others:

- The acceleration of the use of TIC in public administration.
- The acceleration of the use of TIC in business.
- The development of mechanisms and initiative actions for the access of households and small enterprises with TIC equipments and networks.
- The impulsion of economic development based on knowledge.
- The development of business applications in the public sector, online services towards the citizen, online services directed at employees, Online services for enterprises (E-business, E-tourism, e-education, e-culture…)
- Strengthening the telecommunications infrastructure with high and very high speed
- The development of human skills.

- **Modernization of the sector of Higher Education and Scientific Research:**

The five-year strategic plan 2005-2009 of the Ministry of Higher Education and Scientific Research which aims to "put the University of Algeria in tune with the international higher education system" is implemented around several fundamental areas such as, “strengthening and expanding the network infrastructure of training, along with spaces to support the quality of teaching” and “the introduction of new management methods and new managerial approaches, to breathe new life into the mission of the administration, in its support functions and in the conduct of the wider process of reform” With a creation of a subsequent creation of TIC department, Networks and Systems of information and Communication of the University, the Ministry of Higher Education and Scientific Research resolutely affirms its determination to accredit formally and permanently, technology of information and communication as a lever for performance in management and monitoring of the Sector including the adoption of new educational paradigms and new managerial approaches.

- **The actions undertaken in the sector of education and Scientific and technological researches:**
  • Infrastructure development and expansion of networks ARN (Academic Research Network)
  • The Computer Security
  • The use of TIC in the production of content
  • ARN and its applications E-learning, virtual library

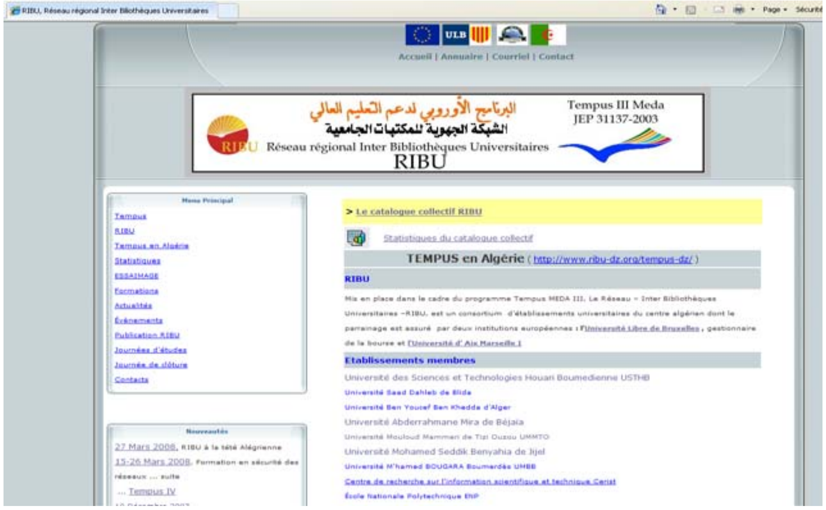
- **University M’Hamed Bougara of Boumerdes: www.umbb.dz**
  There is 25 000 students and 1200 teachers.
  Currently, the university has 5 faculties and one institute:
  - Faculty of Science
  - Faculty of Engineering
  - Faculty of Hydrocarbons and Chemistry
  - Faculty of Law
  - Faculty of Economics, Management and Commercial Sciences
  - Institute of Electrical Engineering and Electronics
  - Research activities are supported by 18 research laboratories and a research unit.

UMBB has got 07 libraries as follows:
01 University Library
05 Faculty Libraries
01 Institute Library
The University Library offers to its readers a verity of documentary resources such as: Local, national and international catalogs, online database or on CD Rome, books, digital thesis, Ejournals.
http://www.umbb.dz/site-bib/ressources-electroniq/base-de%20donnees.htm

UMBB is bound by conventions with 34 national institutions and 40 foreign institutions. She is involved in multilateral projects such as in the ERASMUS MUNDUS *and TEMPUS financed by the UE.*

- **Program RIBU:** http://ribu.umbb.dz

Established under the program Tempus MEDA III, The Network - Inter-University Libraries RIBU is a consortium of academic institutions of an Algerian Center, whose sponsorship is provided by the European Union with two European institutions partners: Free University of Brussels, manager of the award and the University of Aix Marseille I. its goal is to develop a catalog of university libraries of the central region of Algeria.


RIBU, Réseau régional Inter Bibliothèques Universitaires
Page
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البرنامج الأوروبي لدعم التعليم العالي
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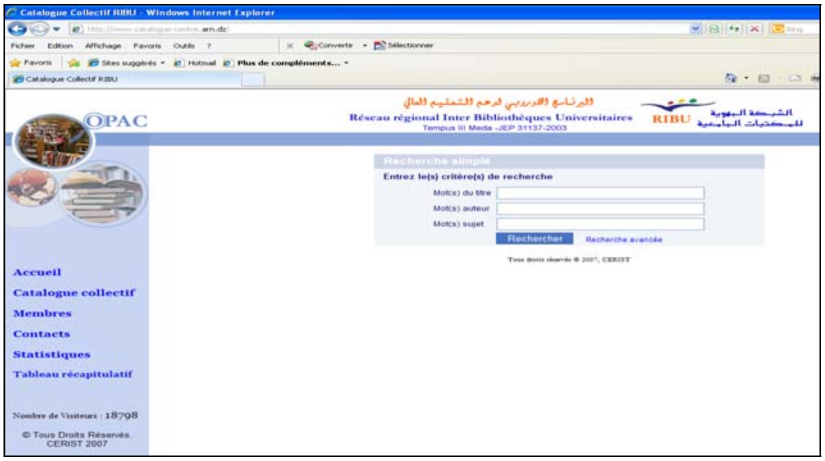
Journées d'études
Journée de clôture
Contacts
Nouveautés
27 Mars 2008, RIBU à la tété Alégrienne
15-26 Mars 2008, Formation en sécurité des réseaux ... suite
... Tempus IV
> Le catalogue collectif RIBU
Statistiques du catalogue collectif
TEMPUS en Algérie (http://www.ribu-dz.org/tempus-dz/)
RIBU
Etablissements membres

Mis en place dans le cadre du programme Tempus MEDA III, Le Réseau – Inter Bibliothèques Universitaires –RIBU, est un consortium d'établissements universitaires du centre algérien dont le parrainage est assuré par deux institutions européennes : l'Université Libre de Bruxelles, gestionnaire de la bourse et l'Université d' Aix Marseille I

Université des Sciences et Technologies Houari Boumedienne USTHB
Université Saad Dahleb de Blida
Université Ben Youcef Ben Khedda d'Alger
Université Abderrahmane Mira de Béjaia
Université Mouloud Mammeri de Tizi Ouzou UMMTO
Université Mohamed Seddik Benyahia de Jijel
Université M'hamed BOUGARA Boumerdès UMBB
Centre de recherche sur l'information scientifique et technique Cerist
École Nationale Polytechnique ENP

Library Portal RIBU (websites)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Sélectionner
Favoris
Sites suggérés
Hotmail
Plus de compléments...
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Réseau régional Inter Bibliothèques Universitaires
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RIBU
الشبكة الجهوية للمكتبات الجامعية
Recherche simple
Entrez le(s) critère(s) de recherche
Mot(s) du titre
Mot(s) auteur
Mot(s) sujet
Rechercher
Recherche avancée
Tous droits réservés © 2007, CERIST
Accueil
Catalogue collectif
Membres
Contacts
Statistiques
Tableau récapitulatif
Nombre de Visiteurs : 18798
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CERIST 2007

Online catalogue

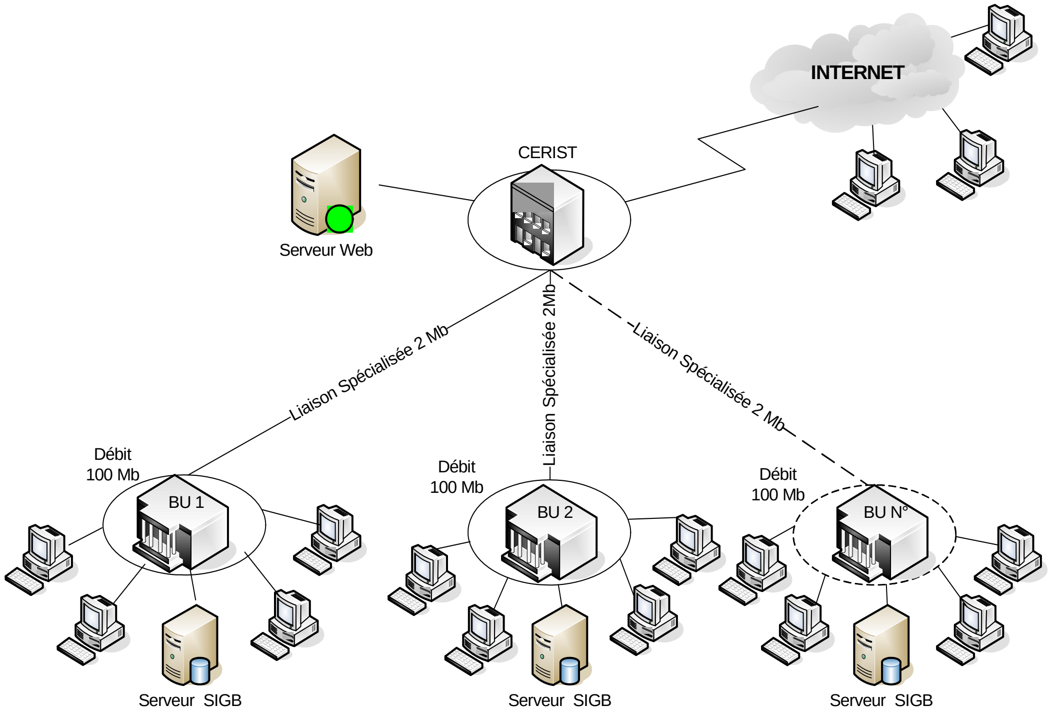
➢ Actions in the program of RIBU:

The project was launched in January 2005 with more shares, the use of a common software library management standard developed by the CERIST (Research Center on Scientific and Technical Information), the technical partner program RIBU, the acquisition, installation and configuration of computer equipment, training of trainers and libraries staff including librarianship, administration and network servers, were provided by the European and Algerian partners to achieve the objective of setting up the catalog.
This catalog lists about a million books (holdings of 10 libraries) that allow both students and researchers to locate the book or document sought.
It lists the collections of nine university libraries of the Central Region and the library's center of research on the scientific and technical information. It was designed under the project Inter University Libraries Network of TEMPUS MEDA III program.
It allows you to request through a single query the catalog of each member library network based on several criteria. The search result is sorted by alphabetically title order. Clicking on a title, the corresponding record is displayed in three modes:

- Public display,
- Display ISBD,
- Display UNIMARC.

The consultation takes place at libraries which hold the selected document and this according to the loan terms of each library.

➢ Architecture of Network RIBU:



- **Results:**

The program RIBU yielded the following results:

- Library Portal RIBU (websites)
- Manuel RIBU (standards and tools) More than 130 trainers trained
- Computerized libraries
- Improvement of library operations
- Reorganization of the circuit (document, work)
- Publication of a book RIBU
- Writing and publishing a document that can serve as a basis for extending the project to other regions of Algeria:
    - The Algerian Universities and challenges
    - The library of tomorrow
    - Genesis, Design and Project Management
    - Computational Aspects and network

- **Level of Computerization of Libraries in the field of higher education and scientific research:**

Most of our libraries are computerized mostly by SYNGEB (System National de la Gestion des Bibliothèques).
About **75%** of University Library is computerized with Syngeb, and the **15 %** with Other (PMB, Winisis, Maktaba, and house application**).** Nearly of **95%** of research center library is computerized with Syngeb.

These results could not be acquired only thanks to the considerable efforts in training staff, computer equipment, design and development of common software and the establishment of a network animated of a cooperation spirit, oriented to the satisfaction of students and researchers. The perspectives are drawn as follows:

1) Short term:
Internal spin (in faculties' libraries)
2) Medium term:
Regional swarming to the non-consortium members university libraries.
3) Long term:
The integration of all Algerian university libraries in all regions combined to form a national union catalog.
For more information about the catalog RIBU, visit the web site:
http://www.catalogue-centre.arn.dz

- **Project ISTeMag "Optimizing access to scientific and technical information in Maghreb universities":** Encouraging the unrestricted sharing of research results with everyone.

The cost of financing: 986.695,15 EUR.
Period of Eligibility: From october15, 2010 to October 14, 2013

Financed by the European Union, this project addresses to higher academic institutions of Maghreb, it aims to:

- Establishing a preliminary study on the state of access to STI :
    - Preparing a detailed assessment of the conditions of access for teacher-researchers and students of Maghreb universities partners.
    - Conduct an analysis at the national level in each partner country giving an overview of access to STI.

- Strengthening the documentary portals of university libraries.
- Establishing documentary consortium to support collective bargaining of the online access to the main sources of information.
- Define and implement an institutional policy on open archives.

European Partners:
University of Brussels ULB (Belgium)
University Provence Aix-Marseille I (France)
University of Cluj-Napoca (Romania)
Electronic Information for Libraries – Eifl

Maghreb Partners:
Algeria:
Ministry of Higher Education and Scientific Research.
University M'hamed Bougara of Boumerdes.
Center of research in scientific and technical information CERIST
University Abou Bakr Belkaid of Tlemcen.
University Hadj Lakhdar of Batna.
Tunisia:
University of Monastir
University of Gafsa
University of Sfax
Morocco
University of Marrakech
University of Casablanca
University of Rabat Souissi
Links of the project: http://biblio.uh2c.ac.ma/tempus-1
http://www.umbb.dz/site-bib/cooperation-bib.htm
http://www.eifl.net/news/EIFL-partners-with-Maghreb-universities

- **Actions of the CERIST (Research center on scientific and technical information): www.cerist.dz**

The center is responsible for implementing programs of scientific research and technological development in the field of scientific and technical information.

As such, it is mainly responsible for:

- Conduct any research on the creation, implementation and development of the national system of scientific and technical information,
- Promote research in the fields of science and information technology, communication and participate in their development,
- Contribute to the coordination and implementation of national programs of scientific and technical information in an agreed framework and in association with relevant sectors,
- Contributing to the building and the promotion of the information society by establishing and developing of sectoral networks of thematic information, including academic and research network, and to ensure their connection with similar networks abroad and by the development and spread of technical information and communication in higher education activities,
- Participate in the modernization of the national university library system by the establishment of virtual libraries,
- Gather the information necessary for the creation of national databases in science and technology and its dissemination,
- Promote research on information and networks security.

We are always seeking to bring changes and innovation in our libraries hoping developing them; this is why our participation in the workshop on **"Establishing Digital Libraries in the Maghreb region of North Africa"** will bring us a new experience in developing libraries.

White Paper submitted for the Digital Library for the Maghreb Workshop
Held in Washington, DC, January 24-25, 2011

Three Kinds of Digital Library Treasure:
Theses, Heritage Libraries, Human Networks

Charles J Greenberg MLS MEd
Cushing/Whitney Medical Library, Yale University
charles.greenberg@yale.edu

When I was first approached about participation in Digital Library for the Maghreb workshop, I reflected on my experience of managing a digital library repository of unique scholarship created by every Yale University School of Medicine (YSM) graduating student. To clarify, many U.S. medical schools have MD/PhD student combining a dissertation with an MD degree. But at Yale, every MD student must propose, develop, submit, and deposit a research thesis. The pre-digital tradition of these deposited theses was that they almost never left the basement of the library.

At best, this undistributed and externally invisible body of print original research might evolve into future journal articles. When I arrived at Yale's Cushing/Whitney Medical Library (1) and encountered the locked cage (literally, it is to this day, for print MD theses, a locked cage in the sub-basement of my Medical Library) of such scholarly treasure, I pondered how to bring this scholarly tradition into the digital library era. Fate intervened when I discovered and received support to attend ETD2000, the 3rd International Symposium on Electronic Theses and Dissertations(2), sponsored by the **Networked Digital Library of Theses and Dissertations** (NDLTD)(3). I came back from that event with a global set of life-long academic colleagues, a basic understanding of the Open Archives Initiative Protocol for Metadata Harvesting (OAI-PMH)(4,5), and awareness of freely-shared repository software to host web-based digital archives. Most importantly, I was embraced by a community that openly shared knowledge in the pursuit of building digital libraries of original scholarship that could be accessed by a global audience of future students and researchers.

At this moment organizations such as NDLTD have also launched dozens of regional and national initiatives to created digital libraries of original scholarship.

- In Africa, the **Database of African Theses and Dissertations** (DATAD)(6) began a program to improve management and access to African scholarly work by emphasizing theses as the significant proportion of Africa's documented research activity.
- **The Australian Digital Theses Program** (ADT)(7) is a national effort based on a collaborative approach in developing sustainable method for distributed input to form a central national metadata database of digitized theses.
- Since 2005, **Library and Archives Canada** (LAC) (8) has started to gather and maintain centralized access to valuable thesis research within Canada, in order to preserve their bibliographic heritage through partnerships with nearly all public and private Canadian universities.

- **Theses and Dissertations Brazilian** (BDTD) (9) is sponsored by Instituto Brasileiro de Informação em Ciência e Tecnologia (IBICT) (10) to also produce a national scholarly network infrastructure.

The same global constituency for digitized theses also includes those with research interest in other original knowledge objects found in digital libraries. Open and accessible non-subscription, web-accessible databases such as Google Scholar (11), WorldCat (12), SCIRUS (13), and Scientific Commons (14) provide starting places for a wide variety of scholarly, government, and cultural content. The ability to harvest item records from institutional digital repositories and place a brief record in searchable indexes is based on the OAI-PMH metadata harvesting standard (5). Databases created with OAI-PMH harvesting point searchers back to the repository copy, leaving the database itself light and responsive, even when hosted by a single university, such as the University of St. Gallen in Switzerland hosting *Scientific Commons*.

While ETD's, the digital versions of theses and dissertations, are an obvious *"low-hanging fruit"* to harvest and organize into a open and accessible digital library, there are at several other digital library projects for other types of materials that would welcome in partnership the germination of digital library collections from countries, universities, or a regional consortium based in the Maghreb region.

- **The Medical Heritage Library**(15) project, initiated by an organization known as the **Open Knowledge Commons**(OKC) (16), is a collaborative effort by an initial group of United States academic medical and research-based public libraries to make important historical texts on the history of medicine available to scholars around the world. This collection is accessible through their space in the **Internet Archive** (17). This project includes digitized copies of other formats, compatible with either web access or downloading in electronic book formats. More than 7800 titles have been processed and are available. OKC invites librarians, university administrators, students, lawyers, and technologists to be part of its network, and it is apparent that these are the same kinds of North African-based professionals and students we seek to encounter and bring into our Maghreb efforts.

- **The Biodiversity Heritage Library** (BHL) (18) is a consortium of 12 major natural history museum libraries, botanical libraries, and research institutions organized to digitize, serve, and preserve the literature associated with biodiversity. The consortium is actively adding international partnerships to share content, protocols, services, and digital preservation practices. Until recently, most resources were available only to those with physical access to the collections, an obstacle to further biodiversity investigation. More than 45,000 titles are part of this open access digital library, covering original publications from 1450 to present.

- **The New Library of Alexandria** in Egypt hosts a **Digital Assets Repository** (DAR) (19), an in-house system to create and maintain Library's digital collections. DAR acts as a systematic process for preserving and archiving the digital media, as well as providing public access to digitized collections. Their digital library focus is on the linkage between digital objects and users that facilitates the exploration of the repository contents based on the user's interests. Personal features have been progressively released since 2005 and are continuing to be developed. Over 170,000 books are now available on DAR's website, including system tools which regulate access to materials under copyright protection.

- The **HathiTrust Digital Library** (20) partnership, administered at the University of Michigan, began in 2008 as a collaboration of the thirteen U.S. universities to establish a repository to archive and share their digitized collections. HathiTrust expanded their model to incorporate more partners (now over 50) and provide easy means to archive original digital content, including both in copyright and public domain materials digitized by commercial and non-profit digitization projects, as well as universities' in-house initiatives. Beyond the institutional interests of the founding institutions, the materials in HathiTrust, in accordance with copyright restrictions, are available as a public good to users around the world. Of the nearly eight million volumes digitized in this project, about two million are publicly accessible.

So much has been accomplished…yet not really. Most of the initiatives just reviewed are taking place within countries and universities with all the natural advantage of visibility, the ability to articulate the non-commercial values of open access, and a human network of committed supporters and employees, the kind of employees described by writer Daniel Pink (21) as compensated well enough that better performance can only be increased by tasks providing autonomy, mastery, and purpose. The materials digitized in these genuine efforts are reflective of the collections on hand and local collection habits. Undoubtedly, the literature and cultural attributes of the countries and North Africa region of the Maghreb is largely absent in libraries with a strong Western collection orientation.

Nearly 58 universities and other institutions of higher education exist in the five countries of the Maghreb region. Undoubtedly some have affiliations with partner institutions in the HathiTrust or BHL. An imperative also exists to enlist those with Fulbright experience in North Africa to identify faculty, librarians, and government ministers that care about reducing barriers to scholarship in their own emerging digital environment. The vision to present to North African colleagues is that the heritage in printed research theses, books, manuscripts, photographs, and documentary archives can be shared digitally in their own communities to reduce access barriers, just as the New Library of Alexandria has demonstrated in Egypt. Remember that a properly planned and constructed local repository with system architecture that incorporates metadata harvesting will then meet the requirement for distributing the local heritage internationally.

Most of the attendees of this Maghreb digital library workshop are not computer system administrators or programmers. Yet many of us have computer programmers and web content developers in our organizations to provide occasional technical assistance. For thesis repositories, none of the day-to-day digital library maintenance or management aspects require any technical or procedural interventions. Most repository software is "turn-key" and user-friendly.

Most of you are familiar with the term open source software. Yet perhaps not all of you are familiar with the tradeoff that occurs when something freely obtainable like open source software requires an unexpected investment in technical care and updating. Academic libraries in the United States already employ a variety of technical support staff to maintain online catalogs and digital library infrastructure. Open source solutions are increasingly adopted when there is confidence that library staff and/or academic information technology staff can rise to the occasion. For example, a team at the Falvey Memorial Library at Villanova University have developed a library search interface called VuFind (22) and since 2007 have released updated versions as an open source product. The Yale University Library and other academic libraries have been drawn to the flexibility and next-generation web features that are attractive to our student and faculty audience and have proceeded to create our own prototypes, like the Yale University YuFind (23) search interface.

What is a Digital Library Network? A human network that can provide services, standards, training, collaboration, and mentoring at a non-individualized level. The model brought to my attention more than ten years ago by the *Networked Digital Library of Theses and Dissertations* (NDLTD) is dedicated to promote open and persistent access to original scholarship produced by institutions of higher education.

Digital libraries are built by both descriptive and technical standards which enhance the organization, access, distribution, and discovery of original scholarship, government and other non-profit reports, and popular culture. The human network engaged with building effective digital libraries must also be engaged with publicity and marketing; several of the projects I highlighted already use and demonstrate blog and wiki online publishing as a simple and inexpensive way to report progress, celebrate accomplishments, and engage users who often become effective advocates. At this point I would judge the technical component of digital library creation well established, and the harder, more practical task that lies before us after this conference is to start to build an international human network architecture that is endowed with capacity for mentoring, learning, and genuine appreciation for opportunities to build global collaboration. The Fulbright Academy will be crucial in building resiliency, trust, and a mutual sense of purpose.

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Communique from the First International Conference on African Digital Libraries and Archives (ICADLA-1)

Held in Addis Ababa, Ethiopia
July 1-3, 2009

Introduction

1. The first International Conference on African Digital Libraries and Archives co-organized by the United Nations Economic Commission for Africa (ECA) and South Africa's University of Witwatersrand had two knowledge for development forums, namely:
    a) Building on Knowledge - Strategic Roundtable with Intergovernmental Organisations on Putting Knowledge on African Development Agenda, and
    b) Connecting Africans to their own resources: Policies and Strategies for African Digital Future.
2. In the first session issue papers touching on Knowledge governance and role of NEPAD in fostering information development in Africa were presented and discussed while the second session mainly focused on development of policies, strategies and capacity building efforts to enhance the digital future of Africa with recognition of the endemic challenges, benefits of current technologies and existing initiatives on digitization of African knowledge and heritage

II. Opening

3. The Opening remarks were made by the Chairperson of the IFLA Africa Section Dr. Buhle Mbambo-Thata who reiterated the commitment of IFLA to Information sharing and stressed the need to build a strategy and policy framework for African digital content and heritage
4. The conference was opened by Dr. Lalla Ben Barka, Deputy Executive Secretary of the Economic Commission on African. She assured the participants on ECA is a knowledge-based organization, working with key partners such

III. Attendance

5. There were 200 participants from all over Africa representing the Librarians, Archivists, Curators, Information Management Specialists, Documentalists professions from the following institutions, Universities, Non-Governmental Organizations, United Nations, International, National Organizations
6. The participants were from Ethiopia, South Africa, Botswana, Senegal, Kenya, Lesotho, Nigeria, USA.

Summary of Concern:

1. Urgent need for knowledge mainstreaming into the African development Agenda
2. Need for creation of an umbrella body
3. Development of policies and strategic framework and road map on digitization, digital libraries and Archives through a consultative approach with an institutional, national as well as a regional anchorage
4. Need for leadership at the library, institutional and national levels that are sensitized on the important role of knowledge development and management in the development of the
5. Institutionalization of self reliance in all projects to avoid dependency on donor funds
6. Ensure sustainability of digitization programmes and projects
7. Develop capacity building strategies for both human resource development in the area of information management as well as physical infrastructure
8. Develop new partnerships and enhance existing ones for better collaboration
9. Need to consolidate and harmonize existing initiatives including best practices to avoid re-inventing the wheel
10. Development of an integrated information system/platform for Africa which will permit sharing of knowledge across partnering countries
11. Evaluate the existing legislation and Intellectual property Rights to update them to be relevant to the current situation/environment and while taking into consideration ownership of content.
12. Need to keep abreast with the current advancement and technologies information management and ICTs in order to reap their benefits including use of Open Source, Open Standards that promote interoperability solution to the digital libraries
13. Change of cultural believes, practices towards a knowledge centric society

IV Challenges recognized:

1. Africa is marginalized with the rest of the world because of the knowledge gap
2. Many African think tanks and reputable knowledge centres generate useful knowledge which are either inaccessible to the policy makers or is unsystematic, unreliable and in some cases so technical that generalist policymakers cannot use it or even understand it. Policy makers do not systematically use available knowledge to improve policymaking
3. Research shows the positive role of indigenous knowledge in the formulation and implementation of sustainable development policies and projects in developing countries, however indigenous knowledge is not properly documented and communicated to better inform policy makers and program implementers in African countries
4. Brain (or knowledge) drain is a major problem for Africa. There is need to develop strategies to use Diaspora knowledge to improve performance in traditional sectors, exploit opportunities for leapfrogging, and develop competitive new sectors. There is also need to learn from other countries and adopt good practices through the Diaspora

5. African countries have not paid enough attention to knowledge and they have not allocated enough resources to the development, accumulation and dissemination of knowledge
6. African leaders do not seem to recognize the central role that knowledge plays in the development process; hence, they have neither closed the knowledge gap nor built knowledge economies.
7. Most countries exhibit fragmented disparate policy instrument on ICTs, Knowledge/information management without comprehensive frameworks for information collection, transfer, access, utilization

Recommendations

1. Proposal for the development of an agency or umbrella body at a regional institution such as AU to spearhead the formulation of comprehensive policies, strategic framework and road map for the digital libraries and archives for the African continent.
2. Development of an integrated information system/platform for Africa which will permit sharing of knowledge across partnering countries and promote the establishment of a Continent digital library/portal mirrored in all African countries to promote cross-border cooperation and connectivity by using knowledge available in centers of excellence in the continent.
3. The NEPAD Secretariat, African Union, RECs and the UN agencies should play a central role to assist African countries to escape the low knowledge trap, build knowledge economies so that knowledge can be harnessed to accelerate the implementation of the priorities of the countries.
4. Showcase indigenous knowledge by popularizing, internationalizing and integrating into the global technologies the rich heritage of Africa as expressed in arts, agriculture, medicine, music, crafts through the activities of library and information centers.
5. Take advantage of established existing regional networks, frameworks such as AVLIN, AISI to constitute the central node in the development of a continental framework for knowledge management given their strategic position and the structures it already has in place
6. Mobilize existing networks and centers of expertise at the different levels to gather the needed knowledge and expertise
7. Need to create at the national level, an environment conducive to the enactment and maintenance of legislation and policies for protecting and safeguarding effective archiving and information dissemination in the country while:
8. balancing the right of access to the national heritage with the need to respect intellectual property rights (IPR) and the privacy of the individual
9. giving special attention to people with special needs.
10. Governments, Institutions should ensure a sustainable infrastructure and funding for archiving and dissemination of information, effective coordination for archiving and information dissemination, creation of an information-conscious and informed societies

11. Develop partnership to ensure cooperation and collaboration at local, national, regional and international levels for preservation, access to and promotion of the national heritage.
12. Create awareness at institutional level, national and regional level, on the new initiatives available for funding Information management and dissemination activities such as eiFL, OSI, etc. so that institutions can take advantage of these programmes for funding.
13. Information managers must keep abreast with the current advancement and technologies information management and ICTs in order to reap their benefits including use of Open Source, Open Standards that promote interoperability solution to the digital libraries.

CGFNS International Digital Library Initiatives

Quinn R. Koller
CGFNS International
qkoller@cgfns.org

CGFNS International is an immigration-neutral nonprofit organization, globally recognized as an authority on credentials evaluation of the education, registration and licensure of nurses, health care and other professionals worldwide.

CGFNS is comprised of the Commission on Graduates of Foreign Nursing Schools, the International Commission on Healthcare Professions and the International Consultants of Delaware.

CGFNS and its divisions provide products and services that validate international professional credentials and supports international regulatory and educational standards for health care professionals.

CGFNS protects the American public by ensuring that nurses and other health care professionals educated in countries other than the United States are eligible and qualified to meet licensure, immigration and other practice requirements in the United States.

Digital Library Initiatives

The credential evaluation process for internationally educated health care professionals has two important components: verifying that the documents submitted are authentic; and, establishing the comparability of the individual's professional education to the minimum professional education requirements of the receiving country. CGFNS International has created two digital library initiatives to address these issues.

For a document to be authentic, it must be issued by the appropriate agency and bear the signature of the agency's recognized authority. It must also bear the official seal of the issuing institution. CGFNS has created a digital resource to track these official signatures and seals, so that credential analysts can compare a document in question against a known good example. CGFNS collects signatures and seals on a controlled paper form, and then captures these forms as high resolution color images. Credential analysts are able to then compare the document they have in hand versus the image. Hard copy forms are archived in case a more technical comparison of the documents is warranted.

Establishing educational comparability requires the comparison of the applicants' course of study against the receiving country's course of study. To accomplish this, program curricula and course syllabi are examined for evidence of course content. The challenge for establishing educational comparability is that curricula and syllabi change over time and educational institutions may close their doors. CGFNS has addressed this by compiling an online library of digitized curricula and syllabi from around the world.

Implications for the Digital Libraries in the Maghreb

At the very least, the digitizing of university and professional curricula, and syllabi where appropriate, should be undertaken. In an era of increasing globalization and internationalization, the movement of those with professional higher education is increasing. The means of establishing educational comparability between sending and receiving countries would be facilitated by such a collection. Furthermore, such a collection would be a treasure trove of information for those researching the growth, development, and evolution of higher education. Finally, such a resource would be invaluable in the case where institutions cease to function.

EIFL: knowledge without boundaries

Rima Kupryte
EIFL
Rima.Kupryte@eifl.net

EIFL is an international not-for-profit organization based in Europe with a global network of partners. We work with libraries around the world to enable sustainable access to high quality digital information for people in developing and transition countries. Founded in 1999, EIFL began by advocating for affordable access to commercial e-journals for academic and research libraries in Central and Eastern Europe. Today, EIFL partners with libraries and library consortia in more than 45 developing and transition countries in Africa, Asia and Europe. Our work has also expanded to include other programmes designed to enables access to knowledge for education, learning, research and sustainable community development. More at: www.eifl.net

Our approach

EIFL's unique approach is to partner with libraries organized in national library consortia – groups of libraries that share common goals – thereby effectively reaching millions of people. Consortia typically include university, research and public libraries, and other institutions. They speak with one voice to stakeholders and policy makers, and share resources and activities in order to serve their communities.

- **We build capacity** by organizing national and international training events, developing tools and resources, providing up-to-date information on issues that affect access to knowledge.
- **We advocate for access to knowledge** nationally and internationally. We represent the interests of libraries and their users in developing and transition countries at international policy fora, develop policy positions and respond to public consultations. We also mobilize stakeholders in partner countries, and produce tools to support advocacy.
- **We encourage knowledge-sharing** through peer-to-peer learning and information exchange, documenting best-practice case studies, organizing an annual partner conference, and facilitating regional cooperation.
- **We incubate pilot projects** for innovative library services to test new models across programme areas.

Our core initiatives

Access to Knowledge for Education, Learning and Research

Access to knowledge is fundamental to education and research, and thereby socio-economic development. Students and scholars in developing and transition countries often rely entirely on the library for learning and research materials. Professionals also need access to current resources for continuing professional development. Libraries equipped with modern ICT infrastructure and skilled staff, offering comprehensive digital collections, can provide this essential support.

Addressing the challenges that libraries and their users face in the digital environment is at the heart of EIFL's programmes.

Current programmes include:

- **EIFL-Licensing: Negotiations and licensing of commercial e-resources** The cost of commercial e-resources can be a major barrier for libraries in developing and transition countries. Through central negotiation with publishers, EIFL negotiates highly discounted prices and fair terms of use to increase access to scholarly material which is essential for quality research and education.
- **EIFL-OA: Open access** Open access seeks to remove price and permission barriers that prevent knowledge from being shared. It provides free and unrestricted access to research materials. It also increases opportunities for scientists in developing and transition countries to contribute to the global research community. EIFL advocates for the adoption of open access policies and mandates by research funding agencies, universities and research organizations. EIFL also builds capacities to launch and sustain open access repositories to maximize access and to increase visibility and usage of research output.
- **EIFL-IP: Copyright and libraries** Restrictive copyright laws create legal barriers to the access and use of resources for education, research and personal development. This can also have financial consequences for libraries in developing and transition countries which have limited funds to purchase copyright-protected materials. EIFL seeks to address these issues by promoting fair and balanced copyright laws that support the library role in providing access to knowledge.
- **EIFL-FOSS: Free and open source software for libraries** Licence fees for commercial software applications can be a barrier to the development of a modern ICT infrastructure in libraries. Libraries in developing and transition countries require affordable, up-to-date software that can be adapted to suit local needs and languages. A wide range of free and open source software (FOSS) applications is available for libraries, but staff often lack the IT skills required. EIFL supports the deployment of free and open source software and provides the necessary training, enabling libraries to achieve significant cost savings.

Access to Knowledge for Sustainable Community Development
The use of technology offers new opportunities to increase access to knowledge, helping to improve standards of living and to transform lives. For many people in developing and transition countries, the public library is the only place to access computers and the Internet, together with quality assured information resources. Through technology, public libraries are also well positioned to extend access to previously under-served communities. Yet in many countries where the need is greatest, public libraries are under-resourced.

Through a new programme launched in 2009, EIFL aims to spark innovative services in public libraries to improve people's lives and livelihoods.

- **EIFL-PLIP: Public Library Innovation Program** EIFL encourages public libraries to reach out to their communities through pilot projects. Following an assessment of local needs, public libraries will develop innovative services using technology in order to improve the livelihoods of people in their communities.

Our achievements

Our approach in developing and supporting strong and sustainable library consortia has proved to be a successful and sustainable model of delivering access to knowledge. As a result of our activities, users have access to a wider range of e-resources than would otherwise have been possible. Through central negotiations with commercial publishers, we have achieved substantial savings in terms of time and money for the libraries in our network. Open access mandates have been adopted, and institutional repositories created, due to our advocacy and support, increasing the visibility and usage of scholarly output from researchers in our partner countries. National copyright laws have been improved as a result of our international advocacy, and through our efforts to build a network of local and regional activists in the library community. We have also enabled libraries to offer enhanced services to their users through better ICT infrastructure.

Over the last ten years, librarians in our network of more than 45 countries have become effective advocates for access to knowledge, and together we have achieved significant change.

Current geographic coverage in Africa

We have presence, knowledge and expertise in the following countries: Botswana, Cameroon, Egypt, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Mali, Mozambique, Nigeria, Senegal, South Africa, Sudan, Swaziland, Tanzania, Zambia and Zimbabwe.

Maghreb activities starting from 2011

EIFL is a partner in a three-year project funded by the EC Tempus Programme, which launched November 1, 2010. One of the goals of the grant is to increase access to scientific and technical information at Maghreb universities (Algeria, Morocco and Tunisia). The grant recognizes the central role that university libraries, as providers of scientific and technical information, play in the dissemination of scientific research results to faculty, researchers and businesses.

EIFL's role in the grant will be to provide the training and expertise in the areas of consortium management, e-resource licensing, and open access.

EIFL staff's experience and professional expertise working with librarians in developing and transition countries puts us in a unique position to provide coordinated training and capacity building. In addition, we can facilitate collaboration between our partner countries in West Africa and Maghreb universities. In our experience, we have found that this type of knowledge sharing and collaboration among peers can be very successful.

CAORC's Digital Library for International Research: A Model for Access to Maghreb Resources

Mary Ellen Lane & Diane Ryan
Council of American Overseas Research Centers
lane.maryellen@caorc.org

Since 1999, the Council of American Overseas Research Centers (CAORC) has maintained the Digital Library for International Research (DLIR), a potential model and vehicle for access to academic resources in the Maghreb. CAORC's mission is to promote international scholarly research, particularly in the humanities and social sciences, by U.S. scholars and academic institutions. For almost 30 years, CAORC, a consortium of international research centers, has worked to support the activities of American Overseas Research Centers around the world. CAORC represents the consolidated international interests of more than 400 American universities, colleges, museums, and research institutes that hold more than 1,100 institutional memberships in CAORC's centers. CAORC currently includes 23 member centers in 25 countries throughout the Near and Middle East, Europe, Central America, West Africa, and South, Southeast, and Inner Asia. CAORC provides this network of Overseas Research Centers with administrative, financial, legal, and policy guidance, promotes communication and cooperation among the centers, coordinates multi-center and multinational activities, sponsors regional research projects, and facilitates the creation of new centers. One of the most important functions CAORC and the centers provide is an institutional network to connect U.S. academics to local scholars and resources in areas of the world where research access is difficult to obtain.

The DLIR is an internet resource that supports the institutional network by providing access to the library collections of 23 member centers and 8 partner institutions. Notably, 5 of these institutions are located in the Maghreb. In addition, there is one center is in Egypt, and one center with a model digital library is located in West Africa (Senegal).

These centers are listed below:

- American Institute for Maghrib Studies (AIMS)
    - Centre d'Etudes Maghrebines en Algerie (AIMS-CEMA), Oran, Algeria
    - Centre d'Etudes Maghrebines a Tunis (AIMS-CEMAT), Tunis, Tunisia
    - Tangier American Legation Institute and Museum (AIMS-TALIM), Tangier, Morocco
- American Research Center in Egypt (ARCE), Cairo, Egypt
- West African Research Center (WARC), Dakar, Senegal
- African Language Materials Archive, a project of the West African Research Association (WARA)

Partner libraries include:

- Beit el-Bennani Library (Tunis, Tunisia)
- Hasna Daoud Library (Tetouan, Morocco)

The DLIR Program

The DLIR program provides library services to member/partner libraries and makes the products of these services freely accessible on the internet. DLIR sponsors an online union catalog (http://catalog.crl.edu/search~S6) and a web site (http://www.dlir.org) that serves as a portal for its digital resources and project activities. The program also provides library training and cataloging and digitization assistance. The DLIR is funded by a variety of private foundations and government agencies, including the U.S. Department of Education's program for Technological Innovation and Cooperation for Foreign Information Access.

There are self-determined levels of activity that may include center participation in the following components of the DLIR:

- the union catalog and digital library
- an international directory of archives and libraries
- special projects to convert resources to electronic data or digital versions
- special projects to promote the member centers and their resources
- programs to provide discounted resources to members

The DLIR program is organized by a Steering Committee and managed by the program coordinator who is a professional librarian and certified archivist. The DLIR program coordinator serves as a central project manager for grant funded projects and as a single interface for management of the DLIR catalog with technical staff, OCLC/WorldCat services, JSTOR subscriptions, and the DLIR web site. A half-time technical assistant who is also a director of one of the member centers joined the DLIR staff last year to further enable the program to use current technologies.

- **The union catalog**

The DLIR shares its catalog with that of the Center for Research Libraries (CRL), an international consortium of university, college, and independent research libraries. CRL acquires and preserves newspapers, journals, documents, archives, and other traditional and digital resources from a global network of sources. Most of the materials acquired are from outside the United States, and many are from the emerging regions of the world: Africa, the Middle East, Southeast Asia, South Asia, and Latin America.

The shared catalog is part of an integrated academic library system, called Millennium by Innovative Interfaces, Inc. It is administered by CRL's IT Department and managed by the DLIR Program Coordinator. Each participating library has its own virtual partition called a scope. Each scope has a number and a unique online public access catalog (OPAC) that reflects the logo and contact points for the institution it represents. Participation is a benefit of a CAORC membership. Partner libraries may be accepted with the approval of the Steering Committee. As of January 2011, there are 218,601 records in the catalog.

Participating in the union catalog provides the following benefits:

- a customized online access page with the appearance of a single catalog
- 24/7 online access to library resources
- a reduction in the amount of work necessary to maintain an academic quality catalog
- catalog records with added value indexing and links to digital content
- advanced search features, including search and retrieval and Arabic script
- the ability to create bibliographies based on catalog searches
- maintenance through the DLIR program coordinator and the Center for Research Libraries

- **The Web portal**

The newly re-designed DLIR web portal, available at http://www.dlir.org, brings together the union catalog, various project materials, digital collections, and databases for easy web access. Two powerful open source content management systems (Omeka and Joomla!) support a seamless and uniform platform for research at minimal cost. The new platform stores digital object data in an integrated database which dynamically serves resources to visitors and better facilitates search and discovery. The integration of the two systems required development of several custom modules to allow the systems to work together seamlessly, but overall the both systems already had the requisite features built-in out of the box to meet the primary needs of DLIR. Moreover, Joomla! and Omeka both have web-based administrative interfaces which improve the ability of the DLIR staff to make changes to data and content as needs arise, allowing for long term development of the resources. As open source software there are no licensing fees associated with use of the systems, and both are supported by large development communities. By centralizing the maintenance and storage of digital objects and content, DLIR and partners will be able to do more with less effort and financial resources.

- **Projects in the Maghreb region**

As mentioned above, the existing CAORC member centers in the Magreb include the American Institute of Maghrib Studies (AIMS) group:

- Centre d'Etudes Maghrebines en Algerie (AIMS-CEMA), Oran, Algeria
- Centre d'Etudes Maghrebines a Tunis (AIMS-CEMAT), Tunis, Tunisia
- Tangier American Legation Institute and Museum (AIMS-TALIM), Tangier, Morocco

Two of these centers have worked on library access projects with partners, namely the Beit el-Bennani, a private library owned and operated by Mohamed Bennani in Tunis, and the Hasna Daoud Library, a private library managed by Mrs. Daoud in Tetouan, Morocco. Working with the CEMAT, the Bennani library contributed 891 bibliographic records to the union catalog (http://catalog.crl.edu/search~S34) and approximately 9,000 digital images from the collection of Tunisian photographer Moustapha Bouchoucha that was deposited at the Beit el Bennani. In a project overseen by TALIM, Mrs. Daoud contributed 12,000 records for books in her private library. Some of these records are still being processed for the DLIR.

- **Projects under consideration in the Maghreb**
    - **CEMAT partner: Institut de Belles Lettres Arabes (IBLA) (Tunis, Tunisia)**
      CEMAT had initially hoped to work with the Institut de Belles Lettres Arabes (IBLA) during the period of the first LALORC grant (2007-2010). However, IBLA suffered the loss of almost a third of its collection due to a blaze that rendered the building unusable and claimed the life of one of the White Fathers who worked there. Revised plans have not yet been formulated but CEMAT hopes to partner with IBLA to help them reorganize their library.
    - **CEMAT partner: Museum Dar Chérif (Enfida, Tunisia)**
      CEMAT is planning to work with Faisal and Habib Cherif at the museum "Dar Chérif" which is located in a converted church in Enfida, a town an hour south of Tunis which enjoyed some fame during the Beylical period (before the French protectorate). They would like to catalog a collection of 50,000 archival documents which refer to many aspects of the Protectorate period in Enfida. Among the more interesting of these documents are records of World War II veterans, as well as the work documents of the (mostly Italian) inhabitants of Enfida, and financial, economic, and property information concerning the town during the Protectorate period.
    - **CEMA Partner: Preservation and Development of the Glycines Research Library Centre d’Etudes Diocésain, Algiers, Algeria**
      The Bibliothèque des Glycines, founded in 1967, would like to further establish their library as a research tool for Algerian and international scholars. It has long been known as an essential tool for research on Algeria and the Maghrib in the fields of history, ethnography, dialectology, archaeology, architecture and literature. A policy of active acquisition of scientific journals dealing with the Mediterranean and North Africa forms an important complement to the collection, making it particularly attractive to Algerian researchers. Les Glycines has approached the CEMA for help with creating wider access for its catalog, and for assistance with conservation and digitization of its materials.

Acquisition and Cataloging of West African Resources

On October 1, 2010, CAORC in cooperation with the West African Research Center (WARC) in Dakar, Senegal began a one-year pilot project to purchase and pre-process print and electronic materials in a range of languages and access to digital content for the Library of Congress (LC). The project, based at WARC in Dakar, will establish regional networks for materials acquisition in ten countries including Benin, Burkina Faso, Côte d'Ivoire, Gambia, Guinea Conakry, Mali, Mauritania, Niger, Chad, Senegal, and Togo. The goal of the pilot project is to develop a practical model for acquisition that could also be used by other entities and U.S. research institutions, or replicated in other world areas like the Maghreb where standard approaches to library acquisition are not practicable.

Project activities include materials acquisition, provision of bibliographic data in USMARC-format, and shipping items to LC. Part of the acquisitions procedure is to establish usage permissions for electronic and online content. LC will provide general guidelines that specify the types of materials and their preferred format. In conjunction with LC, WARC will host a regional training workshop for project staff and country representatives.

Appendix : A complete list of CAORC centers and partners

The alphabetical list below describes the current overseas research center libraries participating in the DLIR program and the current state of their collections. In addition, collaborating libraries and archives can be found on the LALORC website.

- American Academy in Rome (AAR), Rome, Italy
    - AAR Library (AAR-L)
    - AAR Photographic Archive (AAR-P)
- American Center of Oriental Research (ACOR), Amman, Jordan
- American Institute for Indian Studies (AIIS)
    - Center for Art and Archaeology (AIIS-CAA), Gurgaon, India
    - Archives and Research Center for Ethnomusicology (AIIS-ARCE), Gurgaon, India
- American Institute for Maghrib Studies (AIMS)
    - Centre d'Etudes Maghrebines en Algerie (AIMS-CEMA), Oran, Algeria
    - Centre d'Etudes Maghrebines a Tunis (AIMS-CEMAT), Tunis, Tunisia
    - Tangier American Legation Institute and Museum (AIMS-TALIM), Tangier, Morocco
- American Institute for Sri Lankan Studies (AISLS), Colombo, Sri Lanka
- American Institute for Yemeni Studies (AIYS), Sana'a, Yemen
- American Research Center in Egypt (ARCE), Cairo, Egypt
- American Research Institute in Turkey (ARIT)
    - ARIT Ankara (ARIT-A)
    - ARIT Istanbul (ARIT-I)
- American School of Classical Studies at Athens (ASCSA), Athens, Greece
    - Blegen Library (ASCSA-B)
    - Gennadius Library (ASCSA-G)
- Center for Khmer Studies (CKS), Siem Reap, Cambodia
- Cyprus American Archaeological Research Institute (CAARI), Nicosia, Cyprus
- West African Research Center (WARC), Dakar, Senegal
- W.F. Albright Institute of Archaeological Research (AIAR), Jerusalem, Israel

Other centers and their intellectual resources

CAORC is also working with others of its members: the American Institute for Bangladesh Studies, the American Institute of Iranian Studies, the American Institute of Pakistan Studies, the Mexico-North Research Network, the Palestinian American Research Center, as well as with American consortial institutions in Afghanistan, Iraq, and Mongolia to develop intellectual resources. You can learn more about these centers at:

- American Center for Mongolian Studies (ACMS)
- American Institute of Bangladesh Studies (AIBS)
- American Institute of Iranian Studies (AIIrS)

- American Institute of Pakistan Studies (AIPS)
- Mexico-North Research Network (MNRN)
- Palestinian American Research Center (PARC)
- American Institute for Afghanistan Studies (AIAS)
- The American Academic Research Institute in Iraq (TAARII)
- American Research Center in Sofia (ARCS)

Collaborating libraries and their intellectual resources

- American Board Center (Istanbul, Turkey)
- Beit el-Bennani Library (Tunis, Tunisia)
- Hasna Daoud Library (Tetouan, Morocco)
- Yemeni Center for Studies and Research (Sana'a, Yemen)
- Quaid-i-Asam University, National Institute for Historic and Cultural Research (Islamabad, Pakistan)
- Quaid-i-Asam University, Dani Library (Islamabad, Pakistan)
- Department of Archaeology, Exploration, and Excavation (Karachi, Pakistan)
- Center for Archaeology and Environmental Research (Karachi, Pakistan)

Scalable, Interoperable Digital Library Infrastructure for the Maghreb

Ronald L. Larsen
University of Pittsburgh
rlarsen@pitt.edu

The prospects for a digital library of the Maghreb raise substantial opportunities and challenges for both those who conduct advanced research related to digital libraries and those whose interests lie in the documents and artifacts from or about this strategically important area of Northern Africa. In this brief paper, I will draw on the results of several prior workshops to suggest topics of potential importance to a Maghreb Digital Library (MDL), including:

- The 2003 NSF workshop on research directions for digital libraries (http://www.sis.pitt.edu/~dlwkshop/papers.html) held in Chatham, Massachusetts, USA,
- The 2006 "Middle East Digital Library Workshop" held in Alexandria, Egypt (http://www.sis.pitt.edu/~egyptdlw/),
- The 2007 international workshop "Implementing a Maghreb Digital Library for Education, Science & Culture" (http://www.fulbrightacademy.org/page/2007Rabat/) held in Rabat, Morocco, and
- The 2007 NSF/JISC "Repositories Workshop" (http://www.sis.pitt.edu/~repwkshop/) held in Phoenix, Arizona, USA.

The 2003 Chatham report identified digital library research needs in:

- Increasing the scope and scale of information resources and services;
- Employing context at the individual, community, and societal levels to improve performance;
- Developing algorithms and strategies for transforming data into actionable information;
- Demonstrating the integration of information spaces into everyday life; and
- Improving availability, accessibility, and, thereby, productivity.

While research in these areas could ultimately impact favorably on an MDL, the recommendations for development of *scalable, interoperable digital library infrastructure* seem more relevant to the immediate interests of the Maghreb. The infrastructure program recommended in the Chatham report includes:

- Acquisition of new information resources;
- Effective access mechanisms that span media type, mode, and language;
- Facilities to leverage the utilization of humankind's knowledge resources;
- Assured stewardship over humanity's scholarly and cultural legacy; and
- Efficient and accountable management of systems, services, and resources.

Indeed, reflecting on these recommendations, they seem particularly appropriate to the Maghreb. The 2006 Alexandria workshop report instantiates many of the recommendations of the 2003 workshop in the context of the Middle East and lays out a set of principles that generalize easily to the Maghreb. These became the foundation for the 2007 Rabat workshop.

The 2007 Phoenix workshop explored the potential as well as the impediments and challenges to revolutionizing scholarly communication based on advancing global communications and computing infrastructures. It sketched out a roadmap of research and development that could result in the transformation of the underlying infrastructure supporting scholarly communication.

These workshops contribute to a body of knowledge that can positively support the development of a Maghreb Digital Library. The remainder of this short paper summarizes some of these positive impacts.

Acquisition

Millennia of cultural artifacts and documents make the area from North Africa through the Middle East a rich and diverse source of materials that challenges the capacity and capability of contemporary digital libraries. Beyond the materials themselves, current advances in laser 3D imaging and the application of medical imaging (e.g., CT scans) to penetrate ancient artifacts and extract writing from manuscripts without disturbing them present both enormous opportunity and capacious storage requirements. Organizing and managing such diverse resources in a manner that supports the interests of users presents an array of challenges to digital libraries, in general, and metadata generation, in particular.

Access

Artifacts and manuscripts from the Maghreb reside in public and private collections around the world. Scholars conducting serious research into these materials traditionally incur large expense (both in time and money) to gain access. The potential of an MDL to provide uniform access to digital renderings of materials of scholarly interest (without endangering the materials themselves or imposing on their owners) is of immense scholarly value. But lest we oversimplify through glib usage of terms such as “uniform access,” let us remember that these materials are very diverse and complex in terms of their representation.

Usage

Collections in an MDL offer opportunities for the development, testing, and utilization of tools to leverage the cognitive capacity of a highly distributed scholarly community. Collaboration tools that support spontaneous online meetings, for example, seem of particular value. Other “cognition-leveraging tools” identified in the Chatham report include collaborative editing, bibliography sharing, curriculum architecting, semantic tagging, knowledge mapping, visualization sharing, dataset structuring, and creating (shared or personal) logs or diaries of experiments and studies. Tools such as these, organized to support a global scholarly enterprise around an MDL, hold the promise of ensuring that the MDL will be a dynamic platform for discourse and discovery rather than a passive repository of static materials.

Stewardship

Development of an MDL is also motivated by concerns over stewardship of ancient artifacts and manuscripts that may be at risk of being lost or destroyed. The potential of the MDL is that the collection and management of digital renderings of these materials not only increases their accessibility and (hence) value to scholars, but also provides a catalog to the original materials and a surrogate should the originals ever be lost. But digital preservation is known to present its own set of unsolved problems, including the lack of proven storage technologies with substantial longevity and the rapid obsolescence of hardware and software. Add to this the direct threats from viruses and other malicious attacks, and it is clear that an MDL is not without its own challenges to stewardship.

Management

An MDL project provides the opportunity and necessity to consider organizational design. The MDL could develop into a global consortium of participating organizations of varying shapes, forms, and expectations. It provides a potentially rich environment to foster new types of relationships, considering such factors as mission, governance styles, leadership, size, funding models, and an array of potentially challenging policy issues, including intellectual property rights, risk management, privacy, and security. In summary, a Maghreb Digital Library has the potential to become an example of scalable, interoperable digital library infrastructure serving a broad and diverse community around a thematic collection. The potential is certainly there, as is the motivation. An international collaborative effort of development, implementation, operation, and management can serve not only the Maghreb, but also can provide an illustrative example of truly international collaboration serving the best interests of humanity.

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Digital Library Development in Africa: some lessons learned from the DISA experience in South Africa

Patricia Liebetrau
University of KwaZulu-Natal, Durban, South Africa
liebetraup@gmail.com

Introduction:

The Digital Innovation South Africa (DISA) www.disa.ukzn.ac.za initiative started in 1999 as a national project to digitise and make available online scholarly resources to support education, research and training. It fostered collaboration between academic libraries, archives and museums in South Africa. The online archive was intended to support building of content of importance to South Africans, the wider region and the worldwide research community. In the pilot project, scattered issues of forty five serial publications relating to Southern Africa's Struggle for Democracy during the period 1960 to 1994, were sourced, digitised and made freely available as a cohesive virtual resource. Success of the pilot project lead to the development of a second phase. In this phase archival documents relating to Southern African Freedom Struggles, 1950 to 1994, were selected by scholars in collaboration with researchers, activists and archivists, digitised and made freely available online.

Building expertise in digital library technologies:

Skills development is required in so many areas to support digital library development in Africa. Areas such as information literacy, computer literacy, digital conversion, metadata creation, management of content management systems, preservation of digital data and content and more. Students coming out of many Library Schools do not have the required knowledge and skills for creating and managing digital libraries. Short duration training workshops or courses, designed to assist with professional re-skilling, are often insufficient to impart knowledge and confidence.

DISA has developed a programme of internships which has proved popular and effective. The internships last for 2 weeks and cover the entire process of building good digital libraries. The internship enables participants to understand the whole process of managing a digital project and are therefore better equipped to take responsibility for implementation back at their own institutions. Mentoring further assists in providing ongoing support. Training programmes require customisation to individual institutional requirements - one size does not fit all.

Copyright issues:

One of the single biggest challenges of the second phase of DISA was identification of copyright holders in material sourced from archives. Location of, and contact with, copyright holders proved to be a complicated, expensive and time consuming process. It involved many hours of research and communication, often ending with no progress at all. DISA requested permission to digitise resources and make them available online on an open access basis for educational and research purposes. Owners of material retain all their copyrights. Digital copies were provided on request from owners.

One of the valuable lessons learned from this experience is that custodians of materials held in archives, libraries and other institutions are in the best position to identify copyright owners, orphan works and material in the public domain. It is extremely difficult as a third party to carry out these processes and acquire permissions to digitise. Furthermore, access rights, conditions of use, rights information, rights metadata are best managed and maintained by the institutions themselves.

Policy and standards:

National guidance in the form of policy documentation, standards and recommendations for best practices is required for the development of an enabling digital development environment. DISA experienced institutional reluctance to collaborate in digitisation of materials on the basis of lack of national guidance and support for such initiatives. However, institutions themselves are best placed to undertake digitisation as opposed to a centralised or national basis. In this way institutions are able to take ownership of their own digitised resources, develop their own institutional capacity and publish to their own website. Furthermore national or regional bodies often lack sufficient expertise and capacity to provide a leadership role which consequently slows down digital developments in the country or region as a whole.

Moving beyond isolated repositories to a Global Knowledge Society:

Harvesting of metadata from individual digital projects and libraries through repository networks on national, regional and international levels facilitate and will ensure that Africa’s digital resources reach a global society. A lesson learned from the DISA experience is that aggregation services are required to ensure that data provided by data providers meet certain pre-defined and agreed standards and quality. Ongoing quality assurance proved to be a challenge.

Conclusion:

The choice of a suitable model for development of digital libraries in the North Africa region will no doubt have an impact on developments in the continent as a whole. A model which incorporates decentralised development will surely assist and promote institutional capacity and skills development. Knowledge of local resources will support informed metadata creation and use of appropriate thesauri and keywords for online discovery and access. National guidelines for adoption of standards, based on international standards and best practice, will assist in building digital projects and libraries of an international standard while not stifling development with over regulation.

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Towards a Moroccan Digital Library

Abdelhamid Lotfi
Al Akhawayn University of Ifrane
a.lotfi@aui.ma

Globalization and the Internet have dramatically changed the world we live in. The information rich environment and globalization have put yet another challenge to non-Western cultures. We need to make our cultural presence visible to ourselves and to others if we want to be considered as contributing members to world culture. Making our cultural heritage accessible to ourselves and to others is one way to maintain and develop our identity, and to stake a place for ourselves on the world cultural grounds, hence the importance of patrimonial digital libraries.

This white paper provides a brief overview of the Moroccan patrimonial libraries[1] and discusses the Moroccan digitization experience[2].

Moroccan Patrimonial Libraries

Established almost 12 centuries ago Al Qarawiyyin University has been generously supported by the most of the kings of the several royal dynasties that have ruled Morocco, which allowed it to be the premier institution of higher learning until the beginning of the twentieth century and to build the largest library of manuscripts and rare documents in the country. The main library building was erected in 1350 and expanded in the mid sixteenth century to accommodate its growing collection. Today Al Qarawiyyin University library with over 5600 MS of which 3157 are multivolume MS boasts the richest and most varied collection of MS in the country. These MS document the rich cultural history of the nation and witness to the contribution of Moroccans to world culture over the centuries.

The other significant patrimonial libraries in Morocco include the Ben Youssef University library in Marrakesh whose foundation dates back to the middle of the sixteenth century (about 1450 MS), the Tamagrout Zawiya library (over 4200 MS), the General Library and Archives of Tetouan, founded in 1939, the Sbihiyya Library in Salé, a recently established library that has collected over 4000 MS, and last but not least the National Library of Morocco.

These patrimonial libraries bear testimony of Moroccan contributions to world culture and the country's complex interactions with the cultures of the western Mediterranean, the Middle East and sub-Saharan Africa. These MS collections come in parchment (gazelle and goat skin), locally made and imported paper, and a rich variety of bindings, writing styles (Andalusian, Tunisian, Moroccan, Middle Eastern and West African) and languages (Arabic, Amazigh, Hebrew, and Turkish).

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[1] For a more comprehensive discussion of Moroccan libraries see Latifa Benjelloun-Laroui, *Les biblithèques au Maroc* (Paris: Maisonneuve Larose, 1990) and Ahmed Chaouqui Binebine, *Histoire des bibliothèques au Maroc* (Rabat: Faculté des Lettres, 1992).

[2] Abderrahim Ameur, "Elements pour une stratégie de la numérisation du patrimoine culturel marocain: Cas des fonds manuscrits de la Bibliothèque Nationale du Royaume du Maroc" Unpublished MA thesis, Ecole des Sciences de l'Information, Rabat, 2004), "Choix de manuscrits de la BNRM, *Le Magazine Littéraire du Maroc*, N° 5 (Automne 2010), pp.47-54.

Moroccan efforts to digitize the cultural heritage started in the early 1990s when the Moroccan Ministry of Culture produced digital records of the most important pieces of the Moroccan Andalusian music repertoire and the music of the Soussi Berber rwaiss, and digitized the *Assaada Weekly* (1904-1956).

The Moroccan Digital Library

But it is only recently that the National Library of the Kingdom of Morocco (Bibliothèque Nationale du Royaume du Maroc) http://bnrm.ma, has launched the Moroccan Digital Library[3] project designed to preserve, promote and make accessible the nation's documentary heritage, and more particularly rare, unique or fragile documents.

The National Library of Morocco has elaborated a national policy to preserve, promote and disseminate the Moroccan cultural heritage among the members of the national community and beyond, and promote research about this heritage. It has set up a digitization lab to digitize materials for the Moroccan Digital Library whose collection will include Moroccan publications (manuscript books, lithography, maps, journals and newspapers) that are part of the public domain. This initiative falls within the framework of *Maroc Numéric 2013*[4], a five-year national program designed to help Morocco bridge the digital divide.

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[3] http://bnm.bnrm.ma:86/Accueil.aspx
[4] http://www.egov.ma/Documents/Maroc%20Numeric%202013.pdf

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eGrainery – Intenet in a Box

Submitted by Dr. Cliff Missen
University of Iowa / Widernet
missenc@widernet.org

(This section comes from Wikipedia – downloaded Jan 11, 2011)

The **eGranary Digital Library** provides those who lack adequate Internet access an offline collection of approximately 14 million educational resources from more than 1,200 Web sites and hundreds of CD-ROMs.[1] The collection includes more than 50,000 books in their entirety, hundreds of full-text journals, and dozens of software applications.

Through a process of copying Web sites (with permission) and delivering them to partner institutions in developing countries, this digital library delivers fast access to educational materials including video, audio, books, journals, and Web sites. These materials are delivered from Web servers connected to intranet local area networks (LANs) in the subscriber institutions.

The eGranary was invented in 2001 and is developed by the WiderNet Project, a service program of the University of Iowa's School of Library and Information Science. There are now eGranary installations in more than 325 schools, clinics, and universities in Africa, India, Bangladesh, and Haiti. The project aims to expand its installations to thousands of schools, hospitals and universities around the globe.

Few schools, clinics, or libraries in the developing world have adequate connections to the Internet; those connections that already exist are rather costly. By caching and serving educational resources via a local area network, the eGranary Digital Library can reduce an organization's Internet costs—potentially helping them to save tens of thousands of dollars every year. Many eGranary subscribers do not have an Internet connection, but even those who already have an Internet connection find they can open resources up to 5,000 times faster from the eGranary Digital Library.

The eGranary Digital Library contains a built-in proxy server and search engine that gives patrons the true look-and-feel of the Internet, at a speed that is otherwise not usually available to them. The proxy server allows users' Web requests to "play-through" to the Internet if a connection is available.

Since many patrons of the eGranary Digital Library are unfamiliar with using the Internet, a significant amount of librarianship—by WiderNet Project staff and volunteers worldwide—makes finding resources easier. The eGranary's interface includes a word search powered by Luceneand Solr, an online public access catalog powered by VuFind which contains over 60,000 records, and dozens of portals cooperatively developed with experts from around the world to help specific groups of users find information faster.

Since 2010, the eGranary Digital Library includes interactive Web 2.0 features in its Community Information Platform. Thanks to a generous grant from the Intel Corporation, the Community Information Platform allows users to create and share their own content through technologies like built-in Web editors, LDAP security, Moodle, WordPress, MySQL, PHP, Drupal, and others. Subscribers can set up unlimited Web sites on their server and use free, built-in software to make Web pages, upload files and share local information with each other.

As of June 2010, the complete eGranary Digital Library contains over 14 million documents and fits on a 2TB hard drive. Some of the documents in the eGranary Digital Library are in the public domain, some carry a copyleft copyright license, but most of them have been freely provided by their authors and publishers as a contribution to global education. About 6% of the content in the eGranary Digital Library is not available on the public Internet; much of it typically requires a subscription or payment, but authors and publishers have agreed to provide it for free to people in low-bandwidth situations.

One of the guiding principles of the eGranary Digital Library is that the content must not be sold for profit. The WiderNet Project pledges this to authors and publishers when seeking their permission and each subscriber institution signs a license agreement stating that they will make the content freely available to their patrons via their local area networks.

To build a reliable, self-sustaining service, the WiderNet Project has developed a business model that aims to cover ongoing program and development costs through grants, donations, sponsored training programs, and volunteers. So far the organization has raised and spent over $900,000 in nine years to develop, field test, and promote the concept. Volunteers from around the world have put in more than 13,000 hours to assist with computer programming, collecting and organizing new resources, creating portals and curriculum, and building and distributing new libraries.

While the development of new features is funded by grants and gifts, eGranary drives are sold to subscribers to recover production costs without making a profit. Subscribers cover the costs of basic librarianship, the purchase, testing, and preparation of the equipment, the transaction costs (like marketing, licensing, and accounting), and providing on-going technical support and software updates. The WiderNet Project sells eGranary hard drives for $1,500. It comes in two form factors: an external USB model for use at a single computer or an internal hard drive that can be added to a subscriber's server. The WiderNet Project also offers the eGranary Digital Library in a refurbished server for $2,400, a new server for $3,200, and a complete 12-seat computer lab with server and on-site training for $26,000.

The WiderNet Project has also developed an entirely new protocol for delivering content updates to subscribers. The system monitors 1,000+ Web sites for changes, indexes and categorizes the updated items, and then packages them for asynchronous delivery to subscribers via any kind of transport mechanism. (Internet, intermittent Internet, CD-ROM, flash memory, satellite radio…)

Any subscriber can include their own digital content in the eGranary Digital Library, making it a publishing platform for South-to-South communication and collaboration.

Since they incur no bandwidth costs, some subscribers share their eGranary via wireless networks to create wireless public libraries, or knowledgespheres, in their communities.

The eGranary Digital Library represents the collective efforts of thousands of authors, publishers, programmers, librarians, instructors and students around the globe. Some of the many authors and publishers who have granted permission to distribute their works via the eGranary Digital Library include: Wikipedia, the Centers for Disease Control, Columbia University, Cornell University, MIT OpenCourseWare, UNESCO, the World Bank, the Hesperian Foundation and the World Health Organization.

Stuffing the Internet in a box and shipping it to schools in Africa

Posted on internet by Michael Trucano on 10/22/2010 - 18:09
Source: http://blogs.worldbank.org/edutech/egranary

Over the past decade or so, increasing numbers of groups have been working on answers to variations of the following question:

How can the wealth of educational resources on the Internet be brought to the majority of African schools that are today 'un-connected'?

While the Internet has not wrought the similar types of profound, broad societal changes in Africa that it has in other parts of the world, the connectivity landscape in Africa is in fact changing very quickly in many places (for the better!), with (for example) macro-level announcements about progress with new fibre optic cables coming on what seems like a weekly basis.

(For those who like such things, here's a great map to track technical progress in this area. For acronym fans, here are links to announcements about some of the major backbone connectivity initiatives Africa: Glo, RCIP, EASSy, TEAMS, Seacom and LION2.)

Earlier this year the total number of mobile phone subscribers in Africa (over 300 million) passed the total in North America and, while access to the Internet via mobile phones is still low across the continent, it is growing quickly. In Nigeria, for example, published reports now have *mobile phones as the primary access device to the Internet* in Africa's most populous country. There is even increasing talk (and some action) of connecting African educational institutions to the 'cloud' in various ways.

That said, it also undeniable that improvements in connectivity are not coming fast enough, or at a high enough speed or quality, or cheaply enough, for *all*citizens and schools, especially outside major population centers -- and won't any time in the near future.

For years, groups have been attempting a variety of grassroots solutions and approaches across the continent to provide *better options for schools than simply waiting*. Tools such as loband, for example, were designed to strip out the 'extra' stuff in web pages so that they download quicker over slow connections. Some groups have supported training activities related to bandwidth management and optimization, recognizing that many universities (for example) could do a much better job of managing the current bandwidth that they already have. Other have advocated for more attention to designing web pages for faster access in low-bandwidth contexts.

While the connectivity environment for many may not be changing fast enough, one thing that is changing very quickly for *everyone* is the cost of data storage. Back in 2007, a vice president at Google noted that, since 1982, the price of data storage has fallen by a factor of 3.6 million, and that "if this trend continues, and the cost of storage continues to decrease, we estimate that somewhere around 2020, all the world's content will fit inside an iPod, and all the world's music would sit in your palm as early as 2015."

Recognizing this trend, some groups have championed approaches to 'cache' content locally and/or to provide content on physical media like USB sticks or DVDs (one well-known example in ICT4D circles is the Wizzy Digital Courier), physically delivered to remote communities (this is affectionately known as the 'sneakernet', as a nod to the early sneaker-clad 'geeks' who would walk floppy disks between unconnected computers and computer networks).

The eGranary Digital Library has been involved in different aspects of these sorts of activities in Africa for almost a decade. Cliff Missen of the University of Iowa (USA), the driving force behinf the eGranary project, recently stopped by the World Bank to share lessons from experiences across Africa and the results of a recent evaluation report. For those unfamiliar with the eGranary initiative, here's a short description from the project web site:

The eGranary Digital Library - also known as "The Internet in a Box" - provides millions of digital educational resources to institutions lacking adequate Internet access. Through a process of garnering permissions, copying Web sites, and delivering them to intranet Web servers INSIDE our partner institutions in developing countries and other places around the globe, we deliver millions of multimedia documents that can be instantly accessed by patrons over their local area networks at no cost.

The eGranary currently includes about 14 million documents across multiple sectors (this equates to about 2 terabytes of data), with a heavy representation of resources from the health sector. Included in this document cache are full text papers from over 250 academic and scientific journals (interestingly, it turns out that most places don't use them all that much; by far the most popular resource is ... the off-line version of Wikipedia). It has been recently re-architected, so that it can work more seemlessly with multiple hard drives, and new security tools have been introduced. Researchers at the University of British Columbia (Canada) are studying the impact of programs like the eGranary helping to promote information and digital literacy (in Uganda and elsewhere). Currently the eGranary is installed at over 300 educational institutions in Africa and elsewhere, with ambitious plans for expansion.

One criticism that I hear of projects of this sort goes something like this: 'Stuffing the Internet in a box and shipping it to Africa -- do you think that all we are need is your 'knowledge', and that we have nothing to contribute and share ourselves?'

This is a sentiment that the eGranary project has apparently heard, and content creation and management tools like Wordpress and Moodle are now bundled as part of the eGranary as a way to help enable local content creation and curation. However, as the folks at eGranary will be the first to tell you, providing the tool alone isn't usually enough to catalyze local content creation -- a variety of other things need to be done as well. There is no reason, of course, that initiatives like this can't be used as triggers to help with the creation/digitization and dissemination of digital content in local communities. One thing that the eGranary folks highlight, and which they are clearly passionate about, is the need for additional capacity building for librarians throughout much of Africa around issues related to digitized resources. They note that it is not enough to help support better access to, and the development, of digital resources if sufficient energies are not also expended around creating related competence and expertise around the curation of such resources, so that users can find them in ways that are useful and relevant.

Reflecting on some of the lessons emerging from the eGranary and other projects of this sort, a few questions come to mind:

- Given that storage costs are falling more more rapidly than bandwidth costs, how might off-line storage tools of this sort be considered as a matter of course within larger, more holistic considerations of access to information that are an important driver for action to bring better connectivity to schools in poor connectivity environments?
- There is a trend toward increasingly 'open data' around the world. How can projects like the eGranary take advantage of these, incorporating newly released data sets into the document warehouse in ways that are useful? How, for example, might World Bank open data be marketed and made more attractive to be included in off-line document and data respositories like the eGranary?
- One of the clear messages from previous versions of the Africa Tertiary Interner Connectivity Survey (ATICS) was that there was a great need for African universities to better manage the existing (expensive, often poor quality) Internet connections. Wouldn't it be great if bandwidth management and optimization tools could be integrated into resources like the eGranary, as a way to help expose network administrators to them in advance of the arrival of more copious broadband connectivity?
- As storage costs continue to fall, what are the opportunities for things like an 'eGranary on a USB stick' -- or even better, given their increasing ubiquity even in some of the most remote or poor communities around the world, on a mobile phone?

For what it's worth, *another criticism* I hear in some quarters is that creating these sorts of solutions for places that do not have reliable Internet lessens the urgency to bring connectivity to them, relegating certain segments of society to 'sub-optimal' solutions compared with other, more privileged groups. (In a similar vein, some people have criticized an earlier post on the EduTech blog about the so-called One Mouse Per Childproject -- which enables up to 50 children to use the same computer at the same time, each with her own mouse -- complaining that giving prominence to such 'gimmicks' distracts us from more important goals, like providing equal access to all children to educational computing devices.)

While sympathetic to such sentiments, I don't see these as binary, 'either/or scenarios'. In the words of Voltaire, there is a danger that 'the perfect can be the enemy of the good'. Given the opportunity to have an affordable, always-on broadband connection, I doubt few places would opt for tools like the eGranary as a 'replacement' -- nor would the use of tools of this sort lessen the degree to which institutions advocate for better, cheaper, and more reliable bandwidth. Tools like the eGranary, and others covered in an earlier EduTech blog post (*A (digital) library ... in your pocket?*) perhaps should not seen as detours from such larger aspirations and needs, but rather as useful (and inexpensive!) way stations along the various developmental paths that connectivity-poor education institutions of various sorts in Africa (and beyond) are following.

White Paper submitted for the Digital Library for the Maghreb Workshop
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Views of Library Instruction in Morocco:
A snapshot from a 2008-2009 Fulbright Senior Scholar grant experience

Heather Lea Moulaison, PhD
University of Missouri—Columbia
Moulaisonhe@missouri.edu

Introduction: challenges to librarianship in Morocco

Libraries as we think of them in the West are not part of the traditional cultural fabric of Morocco. Certainly, what we call "special libraries" have been around for as long as mosques have been collecting sacred works, but these special libraries and even archives are limited in the scope of their collections and the public that they serve. "Libraries" in the Western tradition were brought to Morocco during the time of the French Protectorate (1912-1956). These libraries supported education and were associated with an elite French-speaking class. Morocco remains, however, a country with a high illiteracy rate and a strong oral tradition. We can expect that the average Moroccan will not appreciate a library in the same way an educated Western reader will, and this appears to be the case.

Specifically, we can identify at least three factors contributing to the disconnect between Moroccan libraries and their users: the collectivist nature of the culture; the developing status of the country; and the extremely complex language situation. First, the library metaphor and the library institution itself may be difficult to appreciate and intimidating to exploit for less-educated Moroccans. Moroccans tend to be social and spontaneous, but libraries are traditionally silent places of solitary work that is both sober and planned. Barriers to use of libraries can be high, and there is little incentive for Moroccans to use the few libraries that exist. Furthermore, text-based library collections will not appeal to illiterate users in a developing nation; when asked about this, one of my contacts gingerly pointed out that the poor in Morocco are struggling for day-to-day survival and that libraries, reading, and even education are not a priority when faced with the possibility of starving.

Another element linked to the developing status of Morocco is the lack of available resources. Though some publishing takes place, for example, overall publishing in Morocco is not robust enough to support libraries on its own. Collections must therefore be supplemented by foreign acquisitions. Foreign acquisitions, however, are hindered by the country's soft currency, the Moroccan dirham, and Moroccan collections suffer for the inability to purchase materials from abroad. Finally, the question of language is also an important one. Moroccan Arabic as spoken by many of Morocco's citizens is called *Derija* and is not a written language. Therefore, all education in Morocco takes place in a "foreign" language. Many Moroccans who learn to read one of the commonly used languages in government (Standard Arabic and French) are not competent in the other. English is increasingly common, but is not a traditional language of education or of the government. Library staff and users must both be at ease in the language of the documents for the information to be stored and made accessible. For these reasons and many others, the challenge to the librarian is great in Morocco.

This workshop is particularly concerned with digital libraries, so it is worthwhile to consider briefly the technological landscape in Moroccan libraries. Compared to modern libraries in the West, computers are exceedingly rare in Moroccan libraries. As of the end of 2009, there were exactly three integrated library systems (ILS) in the country, meaning that only three libraries (University Library in Al-Akhawayn, (Saudi-Moroccan); Fondation Al Saoud (Saudi); and the National Library of Morocco (BNRM)) would in a best-case scenario offer Western-style OPACs for use. The BNRM's OPAC was not operational by the time I left, but the other two were and had been for quite a while. In fact, the two Saudi-sponsored ILS-owning libraries are also OCLC member libraries. The country's Centre National de Documentation (Moroccan) and the Ecole des sciences de l'information (Moroccan) are OCLC member libraries as well, bringing the total number of OCLC member libraries in the country to four.

In the next few pages, I will briefly describe the history of library science education in Morocco and will give an overview of its status and practice when I was there in 2008-2009. In particular, this white paper focuses on observations about the facilities and human resources available to students and instructors, the professors, and the students themselves. While this report highlights the positive aspects of these three elements contributing to LIS education in Morocco, some of the less positive and indeed challenging elements are also documented herein.

ESI: brief history and background

Training librarians and information specialists in Morocco only began in the second half of the twentieth century. Rabat's Ecole des Sciences de l'Information (ESI) was officially begun in 1974. Funding originally came from UNESCO. Dr. Sharify, a Middle-Eastern professor teaching at the library school at Pratt in the state of New York, was instrumental in its founding. A cohort of promising Moroccan students was sent abroad to earn PhDs so that they could return to form the backbone of the school's "corps enseignant". Many were trained in Montreal at the Université de Montréal and are still teaching in ESI today.

Despite a stated interest in research, student learning is the main goal of ESI. Two diplomas are offered: a 4-year undergraduate degree and a 2-year master's degree. Higher education reforms are going to require the number of years for the undergraduate degree to diminish to three and will lighten the load for master's students. Competitive exams are the criteria for entry to both programs. Only a certain number of students are accepted into the school each year. The program is competitive because graduates are almost always assured of finding work. Most of the students in the undergraduate program are recent high school graduates, but some are working professionals returning to receive a degree to better their situation. A small subset of students is from French speaking countries in sub-Saharan Africa.

Today, ESI remains the only Library and Information Science (LIS) school in Morocco, sharing some features with other local institutions. Like the other "schools", ESI is under a Moroccan governmental ministry, the Haut Commissariat au Plan. ESI is the sister institution to the Centre National de Documentation (CND) and the Institut National de

Statistique et d'Economie Appliquée (INSEA). Students are in classes all day other schools of higher education in the French "école" system. Classes begin for all the students at 8:30 am and end at either 4:00 or 6:00 pm every day of the week except Friday, when afternoons are often free in accordance with Muslim tradition.

Background to instruction
Instruction at ESI is carried out in French. As do the French, ESI divides students into librarians (who work with books) and documentalists (who work with documents as special librarians, archivists, etc.). The Anglo-American tradition at one point made the same distinction, but stopped making it in the 1950s when documentalism transformed to become "information science". For this reason, I will describe the curriculum as being one of "library science" even though graduates may find themselves working in libraries (as librarians), in corporate libraries (as documentalists), or in archives (as archivists); graduates do not find themselves working in information science environments. In an attempt to be neutral in face of these two main foci of documentalism and librarianship, ESI calls its graduates "informatists" – a name a founding member of the school made up and that is meaningless in the wider international LIS community. Because the term is unknown outside of the Moroccan library community, the school is often mistaken for being one of journalism, media studies, or other similar "information-rich" fields.

Although some other soft sciences in Morocco may use Arabic as a language of instruction, library science can involve a discussion of computer technology and technical elements of providing access. Perhaps it is for this reason, or perhaps it is because of the strong French tradition in the school, but Arabic is not the language of instruction and is not even taught in the school as a foreign language, while both English and Spanish are. The issue of language also comes into play in the instruction. Because Arabic is not taught at all, graduates can really only work in libraries or information centers that use French systems and house French documents. Further, even if some professors uses Derija for informal joking or for quick explanations, the fact that non-Arab speakers from Francophone countries in Africa are in the classes makes it essential that professors deliver lectures in French.

Evaluation is also tied to culture and language. ESI uses the "French system" for grading, where having 10 out of 20 is a passing grade. Grade inflation, however, has turned the system into something almost akin to the American percentage-based grading system. Professors seem to assume that only the best students have gained entrance, and that for an assignment like an in-class presentation, the lowest possible grade should be a passing grade. In order to continue to the next year of studies, students have to have the "moyenne" of 10/20 in all of the modules. Because of the lenient grading compared to the French system, very few students are held back each year.

Observations about the facilities

Moroccan schools appear to benefit from good stewardship and funding resources; this is interesting, since the revenues do not come from tuition because students attend classes for free; funding is from the parent organization and the government. Classrooms at ESI are equipped with computers, projectors, and Internet jacks. The main auditorium has wifi. A special LIS library is located in a wing of the building, and students are free to use it on their breaks or at lunch. The library is not open after their classes let out in the evening, however, so the library is often very crowded at peak times. The library also has wifi for student use. Several computer classrooms are available for use as well, but must be reserved.

Human resources are adequate, with entire offices supporting students, their internships, and their records of attendance. A guardian lives on the premises, and hired guards protect the entrances to the two buildings in the compound and to the library. Three computer technicians work on hardware and software issues in the classrooms and the faculty offices.

Challenges pertaining to the facilities

Although the benefits are numerous, there are a few elements lacking in comparison to Western institutes of higher education. For example, there are no email accounts for students, making it hard to contact them individually or as a group. Students have limited access to computers, and no course management system is available for professors to use. Most of the technology is very old and does not work well. Projectors have broken cables and are misaligned so that parts of PowerPoint slides hang off the screen in a way that makes the words illegible. The school's website does not meet basic requirements for usability and access, and necessary information is not posted publicly. These problems make it difficult to get students to computers to teach them about new formats, technologies, etc. Another problem of note is the fact that support staff does not post hours, names, expertise, or functions anywhere, including their office doors. There is no phone list, and it is unclear to outsiders who does what and when.

Observations about professors

ESI is lucky to have a core faculty of professors who are known and respected in the field. Many hold doctorates and are active internationally in professional organizations (namely IFLA). New initiatives include a program to hire adjuncts who are recent graduates as a way of bringing excitement, newness, and a fresh perspective to the classroom. This program has been described at conferences held by IFLA and the Association Internationale Francophone des Bibliothécaires et Documentalistes (AIFBD). As an aside, the school sponsors a journal which is published annually, promoting the school's mission of research.

Challenges pertaining to professors

It is difficult for the professors to stay up to date in their fields as there are limited continuing education opportunities in Morocco. In terms of day to day teaching, there is little assistance for instructors. There are no TAs, for example, so assigning research projects means the professor will grade the whole of the class 's papers by himself. Grading 80 or so research projects is a daunting task, especially when students may not be all that fluent in French. Further, there is not much incentive for professors to do research despite the fact that ESI describes itself as a research institution. Not all core faculty have PhDs. Given that there is no program in LIS at the PhD level in Morocco, it is necessary for students to leave the country if they want to earn a doctorate in LIS; some receive a doctorate in a related field so that a doctorate can be earned in-country. It could also be noted that some members of the core faculty without a PhD may lack the rigor and methodology needed to carry out research and to keep up in their field of their own volition.

Observations about students

The students at ESI are delightful. They are highly motivated and inquisitive. Many are self-starting, willing to go the extra mile to have an opportunity to learn. As a group, they are self-organizing, and have in the past had their own newsletter (*Le point sur l'ESI*). There are many student associations that are very active. For example, the students have a tradition of organizing and sponsoring a cultural week in mid-March where they celebrate Moroccan culture and they organize and host a professional Forum in May where they secure sponsorship, invite lecturers, and put on a three-day symposium.

Challenges pertaining to students

Competition among members in the cohort is strong. Students suggest that friendships are difficult to form, and I have observed that some will keep "good information" to themselves instead of publicizing and sharing with others. The fact that students are forced to live off campus does not help, as they may have long commutes adding to their already busy schedules. They also do not have the time to form the friendships that would enhance their social lives and future professional careers.

Students are somewhat limited in the work they produce. Many are not really fluent in French across the board, and problems of expression can limit their ability to make themselves understood. Perhaps the main limitation is that students are seemingly unable to synthesize information or to do any higher order thinking. This seems to be the case, even if they are given explicit instructions and time to ask questions of the instructors. In this way, students are intellectually immature and unable to adapt, despite their young age. Furthermore, they do not purchase textbooks, and are limited to the resources held in the library at ESI. For the reasons described in the first section, new acquisitions tend to be three to five years old, meaning that students are unable to consult the most current works on a topic. The students are somewhat overworked given the demanding class schedule and the structure of their days. I have also routinely heard students (and instructor) say that they live in the "third world" and that there is no need to attempt to better the situation.

Conclusions

Though some detracting elements were mentioned, Morocco boasts a healthy library school with a fine reputation and a solid curriculum. Indeed, Morocco is lucky to have such a good school in which to educate its future librarians. It is worth recognizing that many of the problems with the facilities could also be said to affect LIS schools in the United States. Although ESI's professors may be lacking in resources, they seem to make up for it in good will and hard work. The students, however, are the most important element, as they are the ones who will be on the front lines of Morocco's libraries and information centers in the future. Because of the issues mentioned in the introduction, including problems stemming from society's mindset, the frustrations of living in a developing country, and the limitations brought about by the language issue, it is indeed surprising that morale is as high as it is and that ESI is able to accomplish as much as it does. As I mentioned in the introduction, the graduates of ESI have a daunting task in connecting Moroccans with information, and I wish them all the best.

White Paper submitted for the Digital Library for the Maghreb Workshop
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Maghreb Virtual Science Library: Solving National Challenges To Meet Regional Needs

Kamran Naim and Charles Dunlap
CRDF Global
knaim@crdf.org and cdunlap@crdf.org

Paper begins on next page.

Maghreb Virtual Science Library:

Solving National Challenges to Meet Regional Needs

by Kamran Naim and Charles Dunlap

Introduction

The Maghreb Virtual Science Library program is an initiative of CRDF Global that supports scientific capacity, technology innovation, and regional and international scientific cooperation through the development of an innovative research platform that provides access to comprehensive collections of research information. By providing effective and accessible tools for researchers in the Maghreb to find and download articles from international journals where new discoveries and innovations are published, as well as making research from the region available through a global, open-access delivery model, the program supports the increased engagement of researchers from the Maghreb region in international scientific discourse.

CRDF Global's Virtual Science Libraries program provides a successful model that is an extensible and replicable basis for achieving the Obama Administration's Global Engagement goals of investing in online learning and learning networks and supporting technological development in Muslim-majority countries. Usable access to up-to-date international research publications is a fundamental tool required by nations to support productive and sustainable development for science and engineering communities, and it is critical for engaging young scientists with their peers in the region, and beyond, in collaborating to solve common challenges. A strong civilian research community builds the knowledge-based economy, provides the tools to addresses national challenges in all sectors, creates productive youth opportunities, and is a valuable means of soft diplomacy.

The primary objective of the Maghreb VSL is to develop a set of regionally integrated national research portals for the partner countries that support the needs of the national research sector, that are financially sustainable, and that contain tools to build and maintain new regional and international collaborations. Because an effective Virtual Science Library program requires both good technology and deep experience through an extensive process of assessment and stakeholder engagement, we work to build strong partnerships with the responsible institutions at the national level in each partner country to ensure program sustainability and achieve the broadest impact across the research and education community.

Stakeholder Engagement

Since June 2010, the CRDF Global Virtual Science Library program has met with stakeholders throughout Algeria, Tunisia, and Morocco, including leading research institutes, research libraries, existing library consortia, funding organizations, and government ministries with the appropriate remit to provide initial implementation support, cost-sharing, and long-term funding to sustain VSL systems. We have worked to secure cost-sharing from stakeholders with the capacity to pay and who have the national leadership role in the eyes of their communities in order to provide the maximum possible impact at the beginning of the program.

This wide net cast at the outset underscores an important aspect of CRDF Global's approach: maintaining neutrality and building ties between stakeholders as the VSL is initiated in each country. Our successful work in Iraq reinforces the importance of not designating a preferred or exclusive in-country partner at the outset. Through bringing our unique expertise into the country and establishing a system that meets needs across stakeholder groups, we were able to work with stakeholders who otherwise do not typically join projects together or coordinate efforts. Ultimately, the sustainability of the Iraq VSL has hinged on our "non-aligned" status in the country during the rollout of the project, leading to our ability to attract political and financial support from multiple ministries and individual institutions as the project progressed. We were able to create a relationship in which all sides valued what we did (because we listened carefully to the needs and identified the gaps at the beginning), and then multiple parties approached us to sustain involvement and play a role in continuation. Our capacity to achieve these results was further facilitated by the fact that we are a non-governmental, not-for-profit, mission-driven foundation, so the dynamic in our meetings is inherently on a neutral, collegial footing.

Program Implementation

During the pre-assessment phase of the program, CRDF conducted a "gaps" analysis reflected in Figure 1 to assess the availability of scientific research at institutions across the region. With the exception of Tunisia (whose ministerial agency has subscribed to a wide range of content, although with limited access at some institutions), the countries of the Maghreb were missing a significant amount of the most prominent journals in applied research fields relevant to technological development and national problem solving.

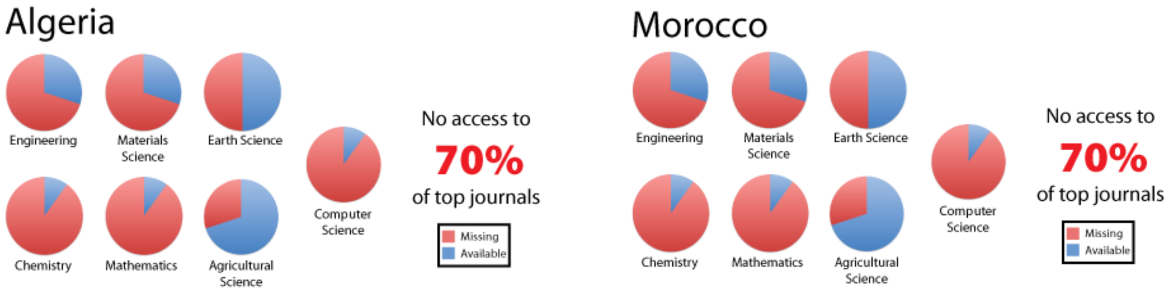

Figure 1. Availability of top twenty-five journals in seven fields of applied research and basic sciences critical to Morocco's and Algeria's development objectives. The top twenty-five journals are ranked by the 2008 Thompson Reuters Journal Citation Reports. Availability is determined by analysis of journal titles available to Morocco and Algeria through the four international programs serving Africa: AGORA (Access to Global Online Research in Agriculture; FAO Program); HINARI (Health InterNetwork Access to Research Initiative; WHO Program); OARE (Online Access to Research in the Environment; UNEP Program): INASP (International Network for the Availability of Scientific Publications; UK).

The assessment stage of the implementation of the MVSL program revealed that each of the three countries involved in the first stage of implementation of the program, Morocco, Algeria, and Tunisia, had made some strides towards improving the availability of scientific information, with varying degrees of success. Each country had centrally-funded organizations with specific mandates to improve the accessibility of research information- in Algeria, the *Centre de Recherche sure l'information Scientifique et Technique* (CERIST); in Morocco, the *Institut Marocain de I'Information Scientifique et Technique* (IMIST); and in Tunisia the *Centre Nationale Universitaire de Documentation Scientifique et Technique* (CNUDST). The institutions were also targeted for partnership due to their institutional remit, which was the broadest possible within each country, covering the largest number of higher education and research institutions.

Based on this analysis, and incorporating the stakeholder needs, the CRDF team worked to determine the specific journal content in technology and applied research to be included in the VSL for each country. We worked to identify what resources were available through the consortia and national agencies, and then we worked to leverage the content of all of the freely available or low-cost resources for which the institutions are beneficiaries (e.g. Research4Life, JSTOR, and the Directory of Open Access Journals). We also worked with our national partners to finalize cost-share agreements, make final determinations regarding participant institutionsi, and make assure that each country had demonstrated sufficient interest, commitment, and potential for sustainability. The Implementation of the VSL in each country was divided into five components:

1. *Securing Partnerships.* Following our first meetings with stakeholders, involve follow-up meetings to discuss implementation strategies, followed by the signing of MOUs (in the case of Algeria and Tunisia) and securing high-level cooperation (in Morocco through IMIST). Through creating partnerships with these organizations we worked to achieve the maximum impact and secure future sustainability. *Content Negotiation*. CRDF received strong interest from publishers to work with us to expand content at the national level in the Maghreb.
2. Through a process of consultation with the in-country partners, priority resources for acquisition were identified. CRDF met with the publishers to discuss opportunities for making their content available to the institutions in the

Maghreb, and will be involved in the negotiation of licenses between the partner institutions and the information providers.

3. *Portal Development*. A key component of the implementation strategy is the development of centralized research portals for each country, through which the researchers are able to access the wealth of information available to them through the subscribed resources, partner programs, as well as Open Access Journals and Repositories. CRDF partnered with Sempertool (a Danish company specializing in open-source library technologies) to apply their Libhub software to facilitate powerful, intuitive functionality for researchers in each country. Through the multilingual portal (made available in Arabic, French and English), researchers are able to conduct searches across the range of resources available, without having to go to the various individual websites of the publishers who provide those journals. Following the implementation of social networking tools, users will soon be able to identify colleagues across the region and initiate online collaborations. Furthermore, by indexing all local research repositories and open – access journals, the portal serves as a platform for increasing the visibility of locally-produced research information.

4. *Training—c*onferences and workshops to announce the VSL and train users. In the Iraq VSL, our training program has been highly effective and critical to the exponential increase in use of the system achieved in the early stages of the program. Because we take a train-the-trainers approach, these trainings can be sustained within the country. Following the launch of the national VSL programs in January 2011, the program will initiate implementation of our training strategy, facilitating workshops for institutions and researchers across the region. By leveraging the online collaboration and publishing tools in each VSL, we aim to ultimately establish a regional Maghreb network that will promote ties and peaceful cooperation between nations.

5. *Regional Journal.* CRDF is working to establish an international-level, peer-reviewed journal that will serve as a platform for publication of research articles of the highest quality from researchers in the Maghreb. Through the careful selection of an editorial and advisory board consisting of prominent scientists and academics from across the region, we aim to develop an open-access publication that will globally disseminate the best research from across the region, and also highlight publications that result from successful regional and international research collaborations.

Conclusion

Outcomes

The Maghreb VSLs will advance national science and innovation interests and form a Maghreb network that will promote ties between nations. Each national VSL website will provide mechanisms for researchers to connect to colleagues in other Maghreb countries for joint research and collaboration, and each will support and stimulate collaborations throughout the global science community. The Maghreb VSL program will be foundational to scientific capacity building initiatives across the region. The program will provide sustainable subscription management models and technology platforms that are user-friendly and that facilitate broad-ranging access by the region's hundreds of thousands of graduate students researchers, and technology entrepreneurs. CRDF Global's approach combines our unique and effective training programs, a unified system of Virtual Science Library website access, and well-established capacity to engage with national government counterparts to assure effective implementation and sustainability.

CRDF Global Capabilities

CRDF Global's Virtual Science Library program is unique and proven. In Iraq, for example, the program is fully achieving the goals that we have for the Maghreb VSL. The Iraqi VSL (IVSL) program has led to a three-fold increase in research publications by Iraqis, a doubling of usage every year (with 50% growth in 2010 alone), and has been fully sustained through government financing since handoff in March 2010 due to the fundamental role that the program has played in the country's recovery and reconstruction. Iraqi scientists are now re-establishing regional ties and leadership in research that will form stabilizing, non-political connections between Iraq, its neighbors, and the international community. Outside of the Maghreb, CRDF Global is now expanding the program to Afghanistan and Armenia. The CRDF Global VSL program is foundational to our capacity-building programs in Professional Skills Training, Higher Education, and Technology Innovation and Entrepreneurship, establishing the bedrock on which national science and technology can advance and secure national success.

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Digital Libraries for Development: the potential for Tunisia

Rim Nour, 06'-07' Fulbright Student Grantee to Columbia University
International Development Consultant
nour.rim@gmail.com

Building and sustaining a knowledge economy has become a pillar since the Tunisian five year plan for the period 2010 – 2014 and as such the country needs to invest in an adequate environment to foster knowledge creation, transfer and sharing as a major driving force of economic and social development. Progress has been steadily observed in areas related to education and ICT access and use but there is still a long way to go especially in terms of workforce development, which accounts for the main asset of the country.

As such, digitizing and aggregating content as well as providing adequate access to a wide array of stakeholders (students, teachers, researchers, business owners, general public, etc) is likely to yield to a positive impact as to moving towards an innovative knowledge economy and allow for Tunisia's libraries to have a more active role in economic development and business growth.

The economic impact of public and private libraries

There are numerous direct and indirect economic advantages to both digital public and privately owned or run libraries of which three obvious and priority ones for Tunisia:

- *Fostering education:* libraries support formal and informal education for both children and adult lifelong learners which in return impacts economic growth.
- *Providing support to businesses:* specific benefits relating to economic development and business creation and development are for example assisting in finding jobs and sector specific information as well as the diffusion of a new technology and knowledge transfer into the community.

  Digital libraries also reduce the cost of conducting market research and finding relevant real time information especially for small businesses.
- *Providing e-government services:* digital libraries facilitate the provision of government services and information which drastically reduces costs for both the provider and the receiver.

Improving on public access to knowledge

Some infrastructure, both physical and online has been put in place as to public libraries; including national libraries but also university and public institutions libraries; however there remains a serious issue of lack of accessibility to these infrastructures and sometimes a lack of awareness of their very existence and/or their use.

For instance, in a country whose primary economic development effort lies in the field of commercial entrepreneurship and export promotion, very few people, entrepreneurs but also the general public, are aware of the existence of the Export Promotion Center (CEPEX: www.cepex.nat.tn/*)’* library or make use of it and there is no mention of it on their website.

The reason it is essential to improve access is that the better the access, the more people make use of libraries which creates a virtuous circle of knowledge sharing and creation. Accessibility goes of course beyond the mere ability to enter the library (be it physical or digital), to concepts of content management, as well as of creating the appropriate space for a community (be it researchers, entrepreneurs, students or neighbors) to come together.

The current Tunisian library system also suffers to a large extent from inadequacy which translates into many factors such as:

- The lack of appropriate space (public libraries) in big cities but even more inside the country.
- Physical libraries seem inaccessible and access requires burdensome bureaucratic procedures. For instance access to engineering schools’ libraries is only done over the counter with often times the library employee ending up choosing the publication for the student.

Photo 1: Library counter at Ecole Nationale des Sciences de l’Informatique (ENSI), one of the best engineering schools in Tunisia. The books are behind those walls and students only have access to the black folder to check which books are available.

- Libraries are regarded solely as a repository of books. No community spaces, no cultural programs, etc
- Tunisian libraries to say the least are very ill designed and unfriendly.
- Aside from some specialized collections, libraries collections are poor and often time out-dated.
- The libraries’ websites are mostly obsolete, even those of online initiatives such as the Virtual Educational Library” /www.bve.edunet.tn” that has been presented during the 2007’ Digital Library for the Maghreb Workshop[1]. Some of the constraints to the implementation of this latter project have been presented at the conclusion of the paper but the very same reasons (lack of funding, waning political will, lack of involvement of the private sector and the civil society) exceed this specific project and are common to most e-government initiatives where there is still a considerable gap between the initial vision and the actual outcome, use and public adoption of the service.

Photo 2: Study space at IPEIT Library (Institut Preparatoire aux Etudes d’Ingénieurs de Tunis), one the best preparatory school to engineering studies in Tunisia. Books are only accessible to students through the library assistant

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[1] Kacem & Frihka Paper submitted for the Digital Library for the MaghrebWorkshop

Although digital libraries should not come as a replacement of physical libraries, they have the potential in countries like Tunisia, where access to ICTs and Internet connectivity are relatively widespread, to constitute a technological leapfrog towards a more inclusive and connected knowledge economy.

Unleashing e-learning through digital libraries

E-learning remains largely an untapped ‘ICT for Development (ICT4D)’ resource in the overall North Africa region and in Tunisia specifically.

In 2005, Tunisia had ambitioned a 20% of student enrollment by 2010 mainly through putting in place a national vision embodied in its Virtual University of Tunis (uvt.rnu.tn)

E-learning had gained an increased attention in Tunisia post the World Summit on Information Society held in Tunis in November 2005 and seminars, workshops and conferences keep being held to study its potential and impacts. Until recently, a seminar titled "e-learning: an opportunity to modernize the public administration" was organized, in collaboration with the United National Development Program country office, as part of the effort of the Tunisian government to take advantage of the full potential of e-governance. E-learning has still however not reached a critical mass neither in the number of students enrolled (12 472 out of a body of ~400k college students) nor in its adoption by the Tunisian learners outside of the formal educational system.

To unleash the potential of e-learning, an important component would be to foster the adoption of the general public and academic researchers alike of the tools, methodologies and most importantly the culture of life-long, self-guided education gearing the learning process towards a more constructionist “know-how” approach than the actual instrcutionist, lecture-based status-quo which would be facilitated by digitizing content and linking it to the appropriate platforms while drastically upgrading the ergonomy and user-friendliness of their web presence.

Digitizing content makes it also easier to cluster special interest libraries (Entrepreneurship, Business, Genetics, Engineering, literature, etc) thus creating and fostering and ecosystem of online communities of practice.

The potential of digital libraries in improving the quality of education in Tunisia

The 2010 edition of the UNDP Human Development Report named the Tunisian ascension over the past 4 decades as part of the so-called “North African miracle” due to its ranking as the 7th top mover world wide as to the human development index (HDI) and praised its success in investing in non-income aspects such as education and public health.

Tunisia has in fact achieved laudable quantitative success, gaining over the period of 1980 to 2010, an increase of over 4 years as to mean years of schooling and an increase of over 6 years as to expected years of schooling. Nonetheless, the Human Development index, even within the newly published UNDP multi-dimensional poverty index, does not yet assess the quality of education.

There is however little need for formal statistical data to come to the conclusion that Tunisian quality of education has been depreciating dangerously notably in terms of pupils' poor performance and early school dropout rates.

One of the many reasons accounting for poor performance is the relationship pupils have to school and the overall lack of motivation generated by the actual educational system. As such, children generally do not associate reading to a pleasant experience. In fact, reading is part of the educational curriculum and is perceived as burdensome and useless, they, understandably, prefer much more playing video games. Experiences around education through online educational games and digital experiences have presumably the potential to transform the relationship children have to reading and learning.

Generally, reading has become a very scarce activity especially amongst the generation-y young adults, explained in part by the excessive costs of books (compared to the average salaries), the lack of diversity in content offering, but also by the lack of incentives or encouragement to read starting from childhood.

Beyond the impact of access on increased reading habits, what might constitute an incentive for people to read more is to browse freely through content and get previews of full versions of reading materials. Just like for businesses, the marketing techniques of book stores, where customers are allowed and provided with seating space, coffee lounges, etc to browse through books and magazines for free, used to transform prospects into buying customers and triggering the buying decision, might in the case of digital libraries transform browsing into reading.

Conclusion

The developmental potential of digital libraries is obviously not exclusive to Tunisia or to the North Africa region, but the country enjoys a high propensity and privileged position to take full advantage of it due to the wide ICT penetration, access, and adoption as well as the necessary political will to carry big scale projects and improve on the environment for a healthy knowledge economy. Another aspect that has not been discussed but that needs to be taken into account is the necessary contribution of the private sector, either in a public private partnership scheme or as a private initiative with an appropriate business model to harness a sustainable and quality digital library system.

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Digital Libraries for Developing Countries

LIAUW Toong Tjiek (Aditya Nugraha)
Petra Christian University
anugraha@petra.ac.id

This white paper will try to share my experience in developing Desa Informasi (Information Village) – a digital institutional repository – for Petra Christian University. I will also share some developments in Indonesia relating to digital libraries/repositories. Some recommendations will be given when appropriate. It is my hope that the shared-experience, information, and recommendations will be of valuable contributions to the discussions that will take place in the workshop

Technically speaking, digital libraries/repositories are databases of digital resources. However there are much more needed to build digital libraries (DLs) than just technicalities. Building the database and applications are actually the easiest parts. Populating DLs and make them used are, in reality, the hardest parts. In my opinion, successfully building DLs require commitments, leaderships, and communications (CLC). Funding is also an essential component. However it will usually follow when we have good advocates with great CLC.

In a country where institution(s) with strong CLC exist(s) – such as the National Library, National Archives, or professional associations – then ideally these institutions should lead the development of that country's DLs. In this case, I think subject digital libraries/repositories are appropriate as the development policy for that country. The subject DLs can range from local heritage, art, and culture to science, technology, and medicine/health. These DLs can be of significant contributions to the development of that country's knowledge, economy, art, and culture.

However it is often the case that such institutions don't exist. I believe this is the case with most developing countries in Asia as well as in Africa. In this situation, I would recommend to approach the issue of DLs developments by encouraging the developments of digital institutional repositories (DIRs). Higher education institution libraries (HEILs), I believe, should take the leadership roles since they are the most likely institutions to succeed in undertaking these endeavors. It is in the HEILs' interest to develop DIRs since DIRs will be beneficial in:

1. capturing the institutions' intellectual outputs as "meaningful indicators of [their] quality" (Crow, 2002);
2. providing local content learning resources for the campus communities;
3. introducing "organization and structure" into campus departments in universities, allowing them "to easily share … information" (Davenport, 2006), which will also enable them to reuse the resources as learning resources as well as publications, promotional materials, etc.;
4. "increasing the institutions' visibility, status, and public value" (Crow, 2002); and

5. strengthening the roles of HEILs on campus.

It's important to emphasize that HEILs should not offer DIRs to campus departments as a library project. HEILs should present DIRs as an information management solution that can answer the needs of campus departments to collect, organize, manage, and re-use/serve digital objects as learning resources (Liauw, 2011). It is in their interests to make use of the DIRs to ease their struggle in organizing myriads of information resources produced by their students and faculties. Campus departments usually will be excited to learn the prospects of being able to store digitally their resources and find them back easily. DIRs will be even more appealing when they can increase the campus departments' visibility in the society.

Another important aspect worth to mention in developing DIRs is to avoid the mistake of leaving the campus departments on their own to populate the DIRs. "The notion that faculty members [(and students for that matter)] will actually push buttons and type metadata in order to deposit materials into IRs [(institutional repositories)] is an *article of faith* among repository-software developers. In practice, however, most deposits are third-party mediated, many by librarians, some by support staff or IT personnel" (Salo, 2008, emphasis added). My experience in developing Desa Informasi confirmed this assertion. Libraries should assume active roles and act as intermediaries between the campus departments and the DIRs.

It might also be relevant to mention here that Webometrics Rankings of World Universities (www.webometrics.info) has released its rankings twice a year since 2007, ranking universities based on their commitments to open access. The rankings were made based on universities' websites, including universities' DLs/DIRs' contents. The Directorate General of Higher Education/DGHE (under the Indonesian Ministry of National Education) – a government agency that oversees Indonesian higher education institutions – has used Webometrics rankings as *one of* many indicators to appraise the performances of Indonesian higher education institutions. This policy has significantly affected the developments of DLs/DIRs in Indonesia. In a way, Webometrics has served as a catalyst to boost the developments on DLs/DIRs in Indonesia since its adoption as *one of* the indicators used by the Ministry of National Education. I would recommend that similar strategy be employed to increase the likelihood of successful DLs/DIRs developments.

The DGHE since early 2010 has initiated a project called Garuda (http://garuda.kemdiknas.go.id), a union catalog of metadata (only) of local content digital resources from various research institutions and universities across Indonesia. In order to address various stages of DIRs development in different institutions in Indonesia, Garuda employs automated metadata collection process (using OAI-PMH/Open Archives Initiatives-Protocol for Metadata Harvesting) as well as low tech/manual batch uploads using spreadsheet applications such as Microsoft Excel. There are currently 35 institutions (as of 10 January 2011), which have submitted their metadata to Garuda. There have been talks to start thinking of taking Garuda to the next level, which is to add functionalities to enable it to create web of citation for scientific publications written in Bahasa Indonesia. This will be a very strategic move since web of citations provided by commercial publishers cover only a small fraction of the scientific publications written and published in Bahasa Indonesia.

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Internet-2

Ms. Ana Preston
Executive Director, Internet-2
apreston@internet2.edu

About Internet2

Internet2 is the foremost U.S. advanced networking consortium. Led by the research and education (R&E) community since 1996, Internet2 promotes the missions of its members by providing both leading-edge network capabilities and unique partnership opportunities that together facilitate the development, deployment and use of revolutionary Internet technologies. By bringing research and academia together with technology leaders from industry, government and the international community, Internet2 promotes collaboration and innovation that has a fundamental impact on the future of the Internet.

Internet2 is a non-profit organization comprised of more than 200 U.S. universities in cooperation with 50 leading corporations, 45 government agencies, laboratories and other institutions of higher learning as well as over 56 international partner organizations. Governed by an executive Board of Trustees and strategic councils consisting of leaders who represent its broad membership, Internet2 members leverage high-performance network and worldwide partnerships to support and enhance their educational and research missions.

Beyond just providing network capacity, Internet2 actively engages our community in the development of emerging technologies including identity and access management, network security, network research and performance measurement and monitoring capabilities that are critical to the progress of the Internet. Combined, these efforts are aimed at realizing the potential of Internet technology, not only for the important work of the research and education community, but to commerce and business, to healthcare and science, to the arts and humanities and beyond.

For more information: http://www.internet2.edu/info

The Internet2 Network

Internet2 provides the U.S. research and education community with a high capacity, high performance national backbone network designed to extend production network services as well as a dedicated platform for researchers to develop and test new networking concepts. The Internet2 Network provides the necessary scalability for member institutions to efficiently provision resources to address the bandwidth-intensive requirements of their campuses. In addition to providing a shared high capacity IP infrastructure to meet these needs, Internet2's ION service allows end users to build dedicated circuits for immediate or future use. Circuits can be built across the Internet2 Network into partner regional, national and international networks, allowing researchers to created dedicated connections to colleagues worldwide.

In July 2010, Internet2 together with partners Indiana University and the Northern Tier Network Consortium were awarded a federal stimulus grant from the National Telecommunications and Information Administration (NTIA) Broadband Technology Opportunities Program (BTOP). Through this funding, Internet2 is now in the process of significantly upgrading its capabilities and will become the first network to deploy a national 100 Gigabit Ethernet infrastructure.

The network will not only meet the current and future needs of the U.S. research and higher education community, but will also extend new capabilities to 200,000 so called "community anchor institutions" nationwide through a new non-profit organization called the United States Unified Community Anchor Network (U.S. UCAN). Through this new network, these institutions which include primary and secondary schools, libraries, community colleges, health centers and public safety organizations will be able to reliably provide life changing applications to their communities including access to services like distance learning and telemedicine.

As it has since its inception, Internet2's Network provides complete transparency into its operations through the Internet2 Observatory, which allows researchers to collect data on the network at all layers and provides real time stats of the performance of the network to the public. Backed by the Global Network Operations Center (NOC) at Indiana University, the Internet2 Network provides superior reliability for its existing community and the new communities it will serve in the coming years.

For more information: www.internet2.edu/network/ or www.internet2.edu/news/btop.cfm

Internet2 International Goals

Internet2 remains steadfast in its commitment to helping our members seize the opportunities and address the great challenges presented by globalization. Globalization is rapidly changing Internet2's mission and strategies – and those of our higher education partners and universities -- and will invariably mold the Internet2 of the future. Today, through its active international programs, Internet2 has come to be viewed around the world as an important component of the global R&E network community, convening divergent groups and bringing global resources together to solve common problems. However, the organization has only begun to scratch the surface on the possibilities that worldwide collaboration can bring.

Science, education, research, and service are efforts not bound by geographic borders. The success of Internet2 will rely on strengthening partnership and collaboration opportunities and in extending capabilities with its international counterparts. Today, Internet2 has over 56 international partners, which enable access to over 100 R&E networks around the world. These partnerships also create the necessary bridges for virtual collaboration between our respective communities, and support the teaching, learning, clinical, and outreach missions of our membership and communities.

As Internet2 university members continue to actively explore the development and enhancement of overseas campuses, Internet2 must continue to strengthen and support efforts to connect the U.S. with partner institutions; and U.S. international campuses to one another. This underscores the importance of Internet2's commitment to support the development of National Research and Education Networks (NRENs) in countries important to the Internet2 membership.

Today, the iconic figure of a lone researcher doing late-night experiments in an isolated laboratory is officially obsolete. Researchers are now deeply involved in worldwide collaborations; the laboratory is now a global facility, connected and supported by a growing global cyberinfrastructure. Many large-scale and distributed science initiatives now underway or in planning including The Large Hadron Collider, ITER, and the Gemini Observatories – to name a few. Technology is shifting more rapidly than ever, changing the way knowledge is acquired, stored, distributed and used

To ensure U.S. researchers can succeed in this environment, Internet2 must continue to work to ensure access to these global science facilities through advanced networks as well as through services above the network (i.e. identity management, cloud services, video, interactive collaboration) all of which are required to maximize researchers access to R&E global resources.

Internet2 can provide a leadership role in both addressing the future needs of the international networking community (including the challenging requirements of the R&E community) while also aiming to promote the creation of a true global fabric of broadband network capabilities reaching both developed and developing regions of the world in order to serve US interests of vital importance, including its research, education, health, economic development, peace and security requirements.

Over the next year, Internet2 plans to reorganize staff resources in support of a strong and well-supported international strategy.

For more information: http://www.internet2.edu/international/index.cfm

Internet2 and Arts, Humanities, and Culture

Internet2 has always hosted two sets of functions—the creation and maintenance of a high-performance network spanning the U.S., and the convening of the research and education community through a staff who provide programmatic assistance to the universities and institutions using the network. Originally, outreach staff lead programming efforts in the Sciences and Engineering and Health Sciences discipline communities. In 2000, Internet2 staff recognized that the performing arts community had much potential in leveraging advanced research networks to support growth in their fields. As a result, an outreach person was named to lead and provide assistance to this community of interest.

Initial proof-of-concept projects were promoted through well-coordinated, Internet2-funded performance events during Internet2's national member meetings. Demonstrations included interactive music instruction, multi-site dance performance, and the ability to stream—in 10.2 immersive audio and high-definition video—a performance from one auditorium to another across the U.S. After the extraordinary successes—and lessons learned— the Internet2 Performing Arts Advisory Council was formed and staffed with early-adopter colleagues. Today, the Arts & Humanities initiative has expanded internationally hosting master classes, remote performance, multi-site performances and workshops including U.S. and European jointly hosted workshops, with interest emerging in the Asia Pacific region in similar joint education and outreach efforts.

For more information: http://www.internet2.edu/arts/

Internet2 and Libraries, Museums, Teaching and Learning

Advanced applications leveraging the Internet2 Network are helping instructors develop new teaching techniques, enhancing the learning experience for students, and extending universities beyond their geographical boundaries. By bringing together learning communities and removing barriers to information retrieval and learning resources—Internet2-enabled applications are changing the way we learn and teach. With support from Internet2's K20 Initiative, students of any age can take a virtual bus to practically anyplace their imaginations can dream up.

Bringing together Internet2's world class network and membership with innovators from colleges and universities, primary and secondary schools, libraries, museums and other educational institutions, the K20 Initiative extends new technologies, applications and rich educational content to *everyone*—no matter where they're located. K20 participants can:

- Access rich media libraries – Super fast connections bring unique, engaging content as close as a click—such as the growing number of streaming media programs offered by the ResearchChannel consortium.
- Use sophisticated scientific instruments remotely in real time – Electron microscopes, radio telescopes and vast networks of undersea sensors—like those used in the Neptune project—are no longer reserved for researchers with doctorate degrees. K20 participants around the country can visualize and manipulate real- time data from NASA satellites overhead or NOAH instruments on the ocean floor.
- Experience virtual classes and journeys of discovery – High speed, high definition videoconferencing expands the curriculum for schools with limited staff, delivers in-service education to those who can't travel to get it and exposes explorers of all ages to exotic worlds they could never otherwise touch.
- Interact with the experts – Write songs with a New York musician, observe doctors in an operating room, ask an oceanographer if he's afraid of sharks, learn Mandarin Chinese from a native speaker, or hold a live forum with your Congressional Representative in far away Washington D.C.
- Share ideas and friendship all around the world – Connect with fellow learners around the globe, hold an international conference without a travel budget, share favorite songs in different languages, or trade ideas with a third grade class.

Internet2 members believe big payoffs come from getting tomorrow’s technologies into the hands of as many innovators and educators as quickly as possible. As one initiative leader put it, “the killer application here is the network itself—the people network and the physical network, and the opportunities they enable.”

For more information: http://www.internet2.edu/k20/

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Developing New Skills and Expertise to Support Digital Scholarship and Scholarly Communication: Roles for Libraries

Brian Rosenblum
University of Kansas, Lawrence, KS
brianlee@ku.edu

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ABSTRACT

The growth of the Internet and digital technology has caused a dramatic and rapid change in scholarly communication practices, giving rise to new forms of digital scholarship and emerging scholarly publishing models. As libraries respond to—and help promote—these changes, they face a number of new challenges and opportunities. Libraries must develop new specialists with specific skills in digital content production and management. At the same time, they must develop a broad, general understanding, among staff across the entire organization, of how changes in scholarly communication practices affect the library enterprise as a whole. This paper discusses three new areas of activity for libraries supporting digital scholarship and scholarly communication: the development of institutional repositories, electronic publishing services, and scholarly communication outreach and advocacy. The paper will also suggest strategies for developing the capacity to support these activities.

LIBRARIES & SCHOLARLY COMMUNICATION

The growth of the Internet and digital technology has caused a dramatic and rapid change in how scholarship is created and communicated. For academic libraries, responsible for preserving and providing access to the scholarly record, these changing scholarly communication practices are creating both new challenges and new opportunities. The challenges include the escalating costs of subscribing to scholarly journals; the explosion of new born-digital content and the corresponding need to manage, describe, and preserve it; and an intellectual property and copyright environment seemingly out of sync with the ways the scholarly community wants to use (and reuse) digital information.

At the same time, there are new opportunities to address these problems and transform the scholarly communication environment altogether. The emergence of the Open Access (OA) movement, for example, offers a model of scholarly communication that embraces technology's potential to make scholarship available worldwide by eliminating or reducing economic, technical and legal barriers to access. Developments in open source software make it easier than ever to publish and distribute scholarship online, and the development of standard metadata formats and search tools ensures that, once placed online, it is easily found and used.

From their position at the crossroads of scholarly communication, academic libraries and librarians have been among the first in the higher education community to respond to—and promote—these changes. As they reassess their own roles in supporting the evolving needs and behaviors of their users, they are identifying opportunities to actively shape the scholarly communication environment and are undertaking a range of new initiatives. These initiatives include:

- creating institutional repositories to support the archiving and distribution of a wide range of scholarly and teaching materials produced by faculty at their institutions
- developing digital publishing services to support the design, management and distribution of online journals and monographs
- engaging in education, outreach and advocacy activities addressing scholarly communication issues.

These three areas of activity (by no means a complete list) are discussed briefly below.

Institutional Repositories

Open-access repositories allow communities (such as disciplines or research institutions) to capture and preserve their intellectual output (published articles, unpublished preprints, working papers, conference presentations, data sets, teaching materials, multi-media objects, and other types of content). By using standard metadata formats and protocols, repositories allow their metadata to be crawled by general and specialized search engines and other web services, thus making their content discoverable on the web to anyone using those tools, without the user having to know in which particular repository the content resides. Repositories can either be discipline based (for example, arXiv.org or E-LIS) or institutionally based, and tend to follow a self-archiving model, in which authors themselves deposit their works. The Registry of Open Access Repositories (ROAR) currently lists over 1000 such repositories worldwide.[1] Research libraries are playing a leading role in the implementation of institutionally-based repositories by building the technical infrastructure, promoting the use of the repository service to faculty and researchers, developing policies regarding their use, and in some cases developing mediated services to help populate the repositories with content.

Libraries as publishers

Another emerging area of activity for research libraries is scholarly publishing. A recent report issued by the Association of Research Libraries (ARL) concluded that “publishing services are rapidly becoming a norm for research libraries,” and that “the question is no longer whether libraries should offer publishing services, but what kinds of services libraries will offer.” In a survey of ARL libraries, 44% of 80 responding libraries reported they were delivering publishing services, and another 21% were planning to do so in the future.[2] These services tend to focus primarily (but not exclusively) on journal publishing, and generally offer a no-frills environment—emphasizing access and visibility, local control, and preservation—for hosting content and for supporting the peer-review and production activities of journal editors.

Although library-based publishing activity is just a tiny fraction of the larger scholarly publishing world, these activities fill an important need, providing support and visibility to new start-up electronic journals, or to departmental journals that may lack the staff and resources to move their print publications online. In addition, these programs are playing a useful advisory role to journal editors and publishers on campus who are trying to understand changes in scholarly publishing and the range of e-publishing options available to them.

Education & Advocacy

Academic libraries are also playing an increasingly visible role in advising and educating the higher education community on scholarly communication issues in general. For example, libraries are engaging in discussions with faculty (in their roles as both instructors and authors) on matters such as copyright issues, author publication agreements, journal policies on self-archiving, and how to comply with new open access policies from the National Institutes of Health and other funding agencies. Libraries are maintaining up to date web sites tracking scholarly communication issues, and organizing seminars on copyright, digital scholarship and other topics. In addition to engaging the campus community in discussion and education, libraries are also actively advocating for change through governance and administrative channels. For example, the Harvard University Library played a leading role in shaping Harvard's recent open access policy, and other universities are exploring similar policies, with strong involvement from libraries. At a national level, librarians are advocating for issues such as open access to federally funded research, and revisions in copyright laws related to orphan works.

NEW ROLES FOR LIBRARIES

The activities described above represent not just implementations of new technology to perform traditional tasks, but are also examples of two important expansions of the responsibilities of academic libraries.

- Libraries have traditionally acquired completed work in a published, static form to adding to their print or electronic collections. They are also now supporting and working directly with faculty and research units before and during the creation and pre-publication stage of research.
- Libraries have traditionally focused on acquiring externally produced work to make available to their local communities. In addition, they are now beginning to take more responsibility for providing stewardship over locally produced scholarship and ensuring that it is accessible to an external, worldwide audience.

These activities are in many ways a natural fit for academic libraries. Because of their ability to leverage existing IT infrastructure and digital production expertise, their close relationships with faculty across all disciplines on campus, and their direct interest in scholarly communication activities, libraries are better situated than many other units on campus to take on these roles.

Nevertheless, these new roles come with a number of challenges for both individual librarians and library organizations. Staff members throughout the organization may be asked to take on new roles and responsibilities, and, as organizations, libraries must figure out how to structure and support these activities in a way that is sustainable. Libraries must develop new specialists with skills in areas such as digital content production, new metadata formats, software development and systems administration, project management, XML markup and other technical skills. At the same time, they must develop a broad, general understanding, among staff across the entire organization, of how changes in scholarly communication practices affect the library enterprise as a whole.

CHALLENGES

One of the biggest challenges is that the scholarly communication environment is still evolving. These services are still new, and standard service models don't yet exist. Although institutional repositories are widespread and growing, they have still not entirely "come into their own," as one study suggests.[3] There are different ideas among institutions and various constituencies about what is the primary role of an IR. Some see the preservation of scholarship as the primary purpose, others see IRs as an assessment instrument to evaluate the output of an institution, and still others see the primary purpose as increasing access and the impact of research. In fact, all these are valid roles for an IR, but having too many uses can lead to lack of clarity and confusion in developing clear service models and in articulating the role of the IR to administrators and the higher education community in general. While IRs are well-known in the library world, awareness of IRs among teaching and research faculty is lower, and faculty self-archiving, probably the most common model for populating repositories, has not been widely successful. There is a need to know more about successful IR implementations, and, indeed, a need to know what defines a "successful" IR and who judges that success.

Publishing services within academic libraries are even more embryonic. Not only are there no established service models, and widely differing administrative and organizational models, but, as the ARL report mentioned above notes, most library-based publishing activity is taking place in "a vacuum of community discussion." There is little documentation about successful implementations, and, again, little idea of how one defines and measures "success." In addition, while libraries are well suited to provide the hosting and dissemination aspects of publishing, there are other areas of traditional publishing where they don't have real expertise or capacity, including peer-review, marketing, business models, printing and distribution. While there is clearly a role for libraries in scholarly publishing, the nature of that role is still not clearly defined,
The third role discussed above—understanding and promoting broad changes in scholarly communication practices—is not just an area for a select group of specialists, but requires a general, ongoing understanding, across the organization, of rapidly developing scholarly communication trends and their implications. Understanding and articulating the implications of scholarly communication change is difficult when the system is still in flux and the full long- term implications are not clear. Not everyone needs to be a specialist and know all the nuances, but even staying up-to-date on general trends is challenging for staff who are already busy trying to simply keep up with their own daily responsibilities.

STRATEGIES

How do individuals and organizations as a whole develop the skills, expertise and capacity to support these activities in a sustainable way? A few general strategies are suggested below:

Allow for pilot testing and a sandbox. For institutional repository and electronic publishing services, pilot testing and room for experimentation is important. Pilot testing helps build the necessary technical expertise for IR or electronic publishing support, helps evaluate system software and workflows, and helps estimate costs and time frames.

Use existing organizational structures to support these activities. Scholarly communication publishing or advocacy activities can take advantage of infrastructure already in place. By leveraging existing resources and embedding new activities in pre-existing structures, rather than set apart on their own as experimental initiatives, these activities are set up to become core library activities rather than experimental initiatives set apart on their own that can be difficult to sustain.

Develop new organizational structures. Another strategy is to bring existing relevant activities in to a new structure that can provide more strategic planning and support. For example, the recently formed Scholar Services program at the University of Kansas brings together digital initiatives, electronic publishing, scholarly communication outreach, GIS & data services, the BudigOne digital workspace together into one program to leverage resources, facilitate planning and improve service quality. Similar programs have been created at other institutions, such as Rutgers University Libraries Scholarly Communications Center.

Reexamine existing workflows and responsibilities. Look for opportunities to involve staff from across the organization. For example, subject liaisons who are already engaged in outreach activities to faculty may be ideally situated to discuss scholarly communication issues and promote new services. E-reserves staff may be able, during the course of their work, to identify material that is suitable for placing in the institutional repository.

Be inclusive. Include a diverse range of specialists and departments within the organization in planning and supporting scholarly communication activities. This helps integrate these activities across the library, and helps build expertise, understanding and capacity across the organization. It also encourages communication, and helps spread the expertise rather than concentrating it in one area.

Explore a variety of training options. There are many possibilities to explore here. Suggestions include: create talking points handouts for library staff covering basic scholarly communication issues; develop informal mentoring and apprenticeships programs; provide in-house workshops and education sessions; utilize wikis, blogs and tools as training space for staff needing to develop or hone new skills; encourage the use of sabbaticals among tenured library faculty to use for professional development.

Develop a network. Tap into established communities of practice. It is critical for practitioners to know what is going on elsewhere with regard to service models, best practices, and new developments in technology. Subscribe to listservs addressing IRs and scholarly communication issues, and find websites and published articles with information or case studies about IR implementations and publishing services.

Establish partnerships. Seek out opportunities for planning and collaboration or planning with other centers of expertise and stakeholders on campus. For example, explore partnerships with university or commercial presses or archives and museums.

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[1] As of May 19, 2008 ROAR listed 1064 repositories in over 60 countries. <http://roar.eprints.org/>

[2] Karla L. Hahn. *Research Library Publishing Services: New Options for University Publishing*. (Association of Research Libraries, April 2008). <http://www.arl.org/bm~doc/research-library- publishing-services.pdf>

[3] Karen Markey, Soo Young Rieh, Beth St. Jean, Jihyun Kim, and Elizabeth Yakel. *Census of Institutional Repositories in the United States: MIRACLE Project Research Findings* (Council on Library and Information Resources, February 2007). <http://clir.org/pubs/reports/pub140/contents.html>

Report on Open Repository Development in Developing and Transition Countries

Iryna Kuchma, eIFL
Brian Rosenblum, University of Kansas

Full text and data available at:
http://hdl.handle.net/1808/6393

This is a survey of open access digital repositories in developing and transition countries, conducted May-September, 2009. This study was conducted with the cooperation of eIFL.net, the University of Kansas Libraries, the DRIVER project and Key Perspectives Ltd. The aim was to create an inventory of current digital repository activities in developing and transition countries at both the infrastructure and services level. This is the first attempt to collect such data about digital repository activity in developing and transition countries and we hope this will serve as a useful resource for promoting open access and repository development in these regions. This report was produced in the framework of the eIFL-OA advocacy program supported by Open Society Institute and the Wellcome Trust. Over the course of six months, 49 repositories from 20 countries on three continents participated in this survey. The following countries are represented: Argentina, Azerbaijan, Brazil, Cameroon, China, Ghana, Hong Kong, India, Jamaica, Kyrgyzstan, Mongolia, Namibia, Poland, Russia, Slovenia, South Africa, Taiwan, Ukraine, Venezuela, Zimbabwe.

International at US National Library of Medicine

Julia Royall, Chief of International Programs
US National Library of Medicine
jroyall@nlm.nih.gov

As the world's largest biomedical collection, NLM has a mission which has been extended to encompass its international activities: to assist the advancement of medical and related sciences through the collection, preservation, dissemination and exchange of information important to the progress of medicine and health.

In 1865, John Shaw Billings, first director of the library, turned to the international community as he built a world-class compilation of foreign medical books, journals, and an international index to the world's biomedical literature of the day: Index Medicus. In the early 1960s Index Medicus production was computerized; this led to the development of the electronically searchable MEDLINE and a comprehensive Medical Literature Analysis and Retrieval System: MEDLARS. Beginning in the late 1960s and up until the mid-1990's, bi-lateral agreements with International MEDLARS Centers (expanding to include centers in 20 countries) licensed and distributed MEDLINE tapes and also provided online access to MEDLINE and other databases to citizens in selected foreign countries. These quid pro quo arrangements provided NLM with valuable assistance in indexing foreign literature and collecting database searching fees. In 1997, PubMed on the web made it possible for anyone with Internet connectivity to access and use all of NLM's databases for free.

NLM's collection retains a strong international character with holdings in over 80 languages. 57% of MEDLINE journals are published abroad, and almost half of MEDLINE/PubMed users live outside the US. Each day a total of 15 million pages of PubMed data are viewed by an international community of users including health professionals, scientists, students, librarians and the general public.

PubMed contains 19 million bibliographic citations and author abstracts from more than 5,000 biomedical journals published in the United States and 80 other countries dating back to the late 1970s. PubMed also provides linked access to related genomic and molecular sequence data. Since the 1980s NLM and organizations in Europe and Japan have exchanged sequence data as part of the International Sequence Database Collaboration, long considered a model for international cooperation in the life sciences.

MedlinePlus is the National Library of Medicine's web site for consumer health information. MedlinePlus also offers a Spanish language version as well as links to health information in 40 languages. Other databases provide information on cataloging and serials, toxicological and environmental health data, AIDS, and other specialized areas.

PubMed Central (PMC) is the NIH's free, full-text digital archive of biomedical and life sciences journal literature. PubMed Central International (PMCI) is a collaborative effort among NLM, the publishers whose journal content makes up the PMC archive, and organizations in other countries that share NLM's interest in archiving life sciences literature. The long-term goal of PMCI is to create a network of digital archives that can share some or all of their respective locally deposited content with others in the network. The first PMCI site was launched in the UK in January of 2007 by the Wellcome Trust in partnership with NLM and the British library. PMC Canada represents a partnership between the Canadian Institutes of Health Research (CIHR), the National Research Council's Canada Institute for Scientific and Technical Information (NRC-CISTI), and the NLM.

NLM's international partnerships strengthen and expand global access to the world's health literature. Targeting another area of opportunity, NLM played a critical role in the Multilateral Initiative on Malaria, leading the effort to enhance Internet connectivity and access to medical literature for malaria researchers at 19 sites in 13 African countries.

The African Medical Journal Editors Partnership Project brings together NLM, FIC, NIEHS, six African journals in Ghana, Uganda, Malawi, Mali, Zambia, and Ethiopia and six partner journals from the US and UK. The project's goal is to strengthen the African journals in order that they are accepted into MEDLINE, making their research available to the world.

The Network of African Librarians and Deans, facilitated by NLM, includes former NLM Associate Fellows from Kenya, Zambia, Mozambique, Mali, Nigeria and collaborating medical librarians from Uganda and Zimbabwe. This group is collaborating in the design, creation, and implementation of an information retrieval course at their universities. In addition, they provide training and workshops at the biannual AHILA conference.

In partnership with the Pan American Health Organization and the United Nations International Strategy for Disaster Reduction and the Regional Disaster Information Center for Latin America and the Caribbean, NLM supports the Central American Network for Disaster and Health Information (CANDHI). This disaster preparedness outreach program strengthens health information infrastructure and improves access to health-related disaster information in Central American countries that are vulnerable to hurricanes, earthquakes and other natural disasters through database and web development, document collection and digitization training, and information sharing.

Training: NLM Associate Fellows Program now includes an international Associate. The current focus is on Africa, and five medical librarians have participated in this program from Kenya, Zambia, Mozambique, Mali, and Nigeria. The Medlars Center at the University of Oslo in Norway is engaged in user training in the Baltic states.

Other international programs include: library services, such as interlibrary loans to foreign institutions; training of librarians and medical journal editors from developing countries; technical consultations; collaboration with international organizations, governmental and non-governmental; meeting with international visitors; and participation as appropriate in formal U.S. bilateral health agreements.

International Medlars Centers*, originally set up to distribute Medline tapes followed by online access in the 1970s, continue to play major roles in partnership with NLM in traditional services such as translation and indexing as well as embracing the new electronic challenges in archiving and dissemination of medical journal articles. In some cases, NLM and international partners are taking on new backup roles for one another in disaster preparedness; others are engaged in training end users in under-served areas of the world.

Archiving and access to full text articles: The British Library, in partnership with Wellcome Trust and NLM, collaborates on co-development of software for UK PubMed Central. CISTI is also collaborating on development of a Canadian site for PubMed Central.

International relationships in translation: BIREME translates MeSH into Portuguese and Spanish for UMLS; INSERM into French; DIMDI into German; Central Medical Library of Russia into Russian; Karolinska Institute into Swedish; Institute of Medical Information, Chinese Academy of Medical Sciences into Chinese; Japan Medical Abstracts Society Thesaurus into Japanese; Nederlands Tijdschrift voor Geneeskunde into Dutch; and Central Medical Library Warsaw, Poland into Polish (in progress). The World Health Organization's Regional Office for the Eastern Mediterranean makes available MeSH in Arabic. Portuguese, Spanish, Croatian, Czech, Finish, French, German, Latvian, Polish, Russian, Slovak, and Swedish MeSH translations are also included in UMLS.

Indexing: The British Library indexes UK journals for MEDLINE; Karolinska Institute does the same for Scandinavian journals; Chinese Academy of Medical Sciences for Chinese journals; and BIREME for South American journals.

Disaster preparedness: In the event of disaster at NLM or at partner libraries in Canada and Germany rendering document delivery service unavailable, backup service would be provided via DOCLINE for requests which could not be filled by in country library network in Canada (via CISTI) and Germany (German National Medical Library)

Document delivery is provided to partner libraries in Antigua and Barbuda, Australia, Austria, Brazil, Canada, Chile, China, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hong Kong, Iceland, India, Israel, Italy, Japan, Korea, Latvia, Lithuania, New Zealand, Norway, Poland, Russia, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, and the UK.

Health Data Standards: NLM supports the development, ongoing maintenance, and coordination of international standard terminologies designed for use in electronic health records and health information interchange and contributes to the development of US policy on health data standards. NLM helped to establish and is the charter US Member of the International Health Terminology Standards Development Organisation (IHTSDO), a non-for-profit association in Denmark, that now owns and maintains SNOMED CT (Systematized Nomenclature of Medicine--Clinical Terms). The IHTSDO was founded to provide international governance and promote international adoption of SNOMED CT, which was originally created by the College of American Pathologists (CAP) through the merger of previous terminologies developed in the US and the United Kingdom. A list of current member countries is available on the IHTSDO website. Membership is open to any country. Licenses to use SNOMED CT are free in Member countries, in countries designated as low-income by the World Bank, and for approved research purposes in any country. NLM also provides funding for the maintenance and free dissemination of Logical Observation Identifiers , Names, Codes (LOINC), which is produced by the Regenstrief Institute and the LOINC Committee and used internationally in the electronic exchange of clinical test data.

Resources for International Librarians, Health Professionals and Researchers in Developing Countries:
http://www.nlm.nih.gov/services/international.html
*Active Medlars Centers

CANADA	Canada Institute of Scientific & Technical Information (CISTI) 1970
CHINA	Institute of Medical Information (IMI) at Chinese Academy of Medical Science 1986, No MOU, Tape License Agreement
EGYPT	Egyptian National Scientific & Technical Information Network (ENSTINET)/ Center for Educational Technology (CET) 1986, No MOU, Tape License Agreement
FRANCE	Institut National de la Sante et de la Recherche Medicale (INSERM) 1969
GERMANY	Deutsches Institute fur Medical Documentation und Information (DIMDI) 1969
HONG KONG	Li Ping Medical Library of The Chinese University of Hong Kong (CUHK) 1996
INDIA	National Informatics Center of Government of India 1987
ISRAEL	Berman National Medical Library, Hebrew University, Hadassah Medical School 1993
ITALY	Istituto Superiore di Sanita, Minestero della Sanita 1978
JAPAN	Japan Science and Technology Agency (JST) 1974

KOREA	Medical Library, Seoul National University 1991
MEXICO	Centro Nacional de Informacion y Documentacion sobre Salud (CENIDS) 1976
RUSSIA	The State Central Scientific-Medical Library of Russia (SCSML), Russian Ministry of Health 1997
SOUTH AFRICA	South African Medical Research Council 1976
SWEDEN	Medical Information Center, Karolinska Institute Library and Information Center (KIMIC), Karolinska Institute 1968
SWITZERLAND	Documentation Service (DOKDI) of the Swiss Academy of Medical Sciences (SAMS) 1980
UNITED KINGDOM	The British Library 1968
PAHO/BIREME	Latin American and Caribbean Health Sciences Information Center 1972

The Role of Outreach in Building ScholarsArchive@OSU

Richard Sapon-White
Head of Cataloging, Oregon State University
richard.sapon-white@oregonstate.edu

Oregon State University Libraries (OSUL) manages the university's institutional repository, ScholarsArchive@OSU (http://ir.library.oregonstate.edu/xmlui/). As with other institutional repositories, ours seeks to capture the intellectual products of our institution's departments, research centers, faculty and students. It also contains digitized resources from the university's library and archives. As such, it is comprised of many different kinds of electronic resources: theses and dissertations, out-of-copyright books, photographs, faculty post-prints, department newsletters, internal reports, conference presentations, and more. As of January, 2011, ScholarsArchive@OSU is ranked 31st in the world according to the Ranking Web of World Repositories http://repositories.webometrics.info/ based on size and visibility of the repository. ScholarsArchive@OSU could not have reached this ranking without thoughtful, planned outreach to change attitudes about scholarly discourse at our university. This has been done through meetings and presentations between the managers of the repository and various units and individuals on campus. This paper describes briefly some of the components of this outreach effort that have made it successful.

Since its founding in 2005, OSUL has urged faculty on campus to submit their post-prints, conference presentations, and posters to ScholarsArchive@OSU. There have been several avenues for doing this. Staff of the Center for Digital Scholarship and Services (CDSS), in particular the Digital Production Unit (DPU), frequently give presentations on campus about the repository. The presentations describe ScholarsArchive@OSU and the advantages of contributing to it. These advantages include open access to scholarly work, the resulting greater visibility and impact of that work, preservation, and collation of the scholarly output of faculty, departments, centers, and colleges. Submission of files can be done directly by faculty members following instructions posted on the repository website. In 2010, with the reorganization of CDSS, two public service librarians now also participate in outreach efforts to campus units in the hope that more faculty will submit their work to ScholarsArchive@OSU.

Marketing ScholarsArchive@OSU to the campus community is not sufficient to encourage some faculty to deposit their works in the repository. Several adjunct services are offered by OSUL to facilitate submission of papers and presentations. On request, DPU staff will evaluate the copyright status of faculty publications to determine if they can be uploaded to ScholarsArchive@OSU. This is done by having the faculty member submit a curriculum vitae to the DPU. DPU staff then check the SHERPA/RoMEO database (http://www.sherpa.ac.uk/romeo) for copyright information and determine for each paper or presentation whether the author has the right to post his/her work to an open access repository. This information is then passed along to the faculty member so that permitted papers can be submitted to ScholarsArchive@OSU or, if no entry appears in RoMEO, to contact journals for permission to self-archive. (RoMEO is a "searchable database of publisher policies on the self-archiving of journal articles on the web and in Open Access repositories" that was created by SHERPA (Securing a Hybrid Environment for Research Preservation and Access), a consortium of research institutions and organizations.) In addition, if the faculty member desires, DPU staff will upload files for them and supply metadata as well, further reducing barriers to submission of scholarly works to the repository.

In order to promote the concept of open access and self-archiving, in March, 2009, the Library Faculty Association passed a resolution to self-impose a mandate for their members to submit their scholarly work to ScholarsArchive@OSU. This open access policy, the first by any library faculty, requires that all articles, internal reports of interest to an outside audience, substantial presentations, book chapters, conference papers and proceedings be made publicly available via the repository. If a publisher will not agree to the terms of the policy, then the policy may be waived. Compliance with the mandate may be considered when evaluating faculty members for promotion and tenure. The OSU College of Oceanic and Atmospheric Sciences faculty also agreed to a similar mandate in 2010.

By the end of 2010, over 18,000 items have been uploaded to ScholarsArchive@OSU. The success of building content in the repository is due in part to the outreach done by OSUL faculty to the various units of the OSU campus. This outreach goes beyond advertising the repository's existence. Personal contact with campus units allows for educational presentations about copyright, author's rights, open access, and scholarly communication in addition to describing the support services offered by DPU to facilitate the submission of papers and presentations.

OSU's experience with building its digital library has implications for creating a digital library of the Maghreb. First, having a unit devoted to outreach is critical. The unit needs to be able to educate potential contributors about the open access movement, changes in scholarly communication, and copyright issues so that the target audience can understand the advantages for them, their institutions, and the dissemination of knowledge. Although OSU has such a unit of people, OSU's model is at a single institution. Depending on the ultimate nature of the digital library of the Maghreb, this "unit" may consist of a cadre of designated outreach experts at multiple institutions and/or spread over a wide geographic area. This cadre should function under the same set of guidelines and procedures, with regular communication amongst its members.

Second, in order to promote open access and encourage submissions, knowledge of the copyright permissions allowed by scholarly journals and other publications need to be known. Coverage of North African scholarly journals by the SHERPA RoMEO database is very poor. Only two journals from the Maghreb are listed, *The Libyan Journal of Medicine*, published by Co-Action Publishing (which allows self-archiving of post-prints and the publisher's pdf, and *Le Journal Tunisien d'ORL et de Chirurgie Cervico-Faciale*, an open access journal (self-archiving probably permitted, but specific policies are not recorded in the RoMEO). Contact with other journals and the contribution of their policies on self-archiving to the database will facilitate submissions to a digital library.

Lastly, institutional commitment to an open access repository ensures ongoing growth of content. When researchers or faculty at an institution see the results of depositing their work, whether through new peer contacts or the number of downloads of their post-prints, they are likely to support efforts that encourage others to self-archive as well. The impact of the self-imposed mandates of OSU faculty has been significant; presumably such a development at other institutions would have a similar result.

White Paper submitted for the Digital Library for the Maghreb Workshop
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Valuing Publicly Provided Information: Agricultural Data and Analysis

David Schimmelpfennig*
Economic Research Service (USDA)
des@ers.usda.gov

It may seem like a no-brainer that information has value; when you add that the information is provided free-of-charge on the World Wide Web some might ask if this is not stating the obvious. The answer to this question can be more complicated than first thought. Research on economic data related to agriculture that has been carried out at USDA's Economic Research Service (ERS) finds that a number of factors can influence the value of publicly provided data and analysis. The following examples from ERS' publications have been selected to highlight factors that might influence the value of this information. The elements of "free" data and analysis that have repeatedly been shown to impact its value are related to:

a. **Quality** in terms of coverage and comprehensiveness;

b. **Accuracy** may be increased at higher cost which could also add to data volume, possibly impacting accessibility and usefulness;

c. **Unbiasedness** in collection and reporting; and

d. **Timeliness** in terms of either current information, or if historical, then available when needed for analysis and policy evaluation.

Added complications arise when interaction effects come into play. Accuracy, for example, can be seen to trade-off with timeliness if added accuracy requires additional time for collection, organization, and dissemination. ERS officially publishes reports and data on its own web-site as a part of USDA's program of research requiring that it be peer-reviewed and double-checked before being posted to the web. "Many scientists are concerned that publicly posted content that has not been peer reviewed could be used out of context" (quoted from the article "Technology: Libraries of the future" by Aleks Krotoski, Nature, volume 468, page 633, 2 December 2010, doi:10.1038/468633a). The article goes on to discuss a hands-on exhibition at the British Library, London, making the point that online tools might be shaping the way we use knowledge.

Making the operation of these factors more concrete, a series of examples of recent ERS research and their data-products are presented below to highlight how each value-factor might contribute to building value in different ways. Space limitations do not allow the reports themselves to be discussed in any length so a few more details about each one including its abstract is presented in a source appendix at the end.

*The views expressed are the author's and should not be attributed to the Economic Research Service or the USDA.

1. **Food Security Assessment, 2010-20** http://www.ers.usda.gov/Publications/GFA21/

While world hunger is under continual scrutiny particularly at a regional level and its reduction is explicitly addressed in the 2015 Millennium Development Goals of the United Nations, there have been few studies that comprehensively evaluate food security for 70 developing countries as was done for this report. The Assessment has been carried out each year for more than a decade at this point, and the **quality** and usefulness of the project is enhanced by its broad coverage of countries over time. Comprehensiveness is another factor contributing to the **quality** and the value of the report with detailed statistical tables for individual countries presented in Excel spreadsheets. The regions covered and the sizes of their associated spreadsheets are: North Africa (958 Kb), Sub-Saharan Africa (5,285 Kb), Asia (3,245 Kb), Latin America and the Caribbean (2,643 Kb), and the Commonwealth of Independent States (2,074 Kb).

2. **Accelerated Productivity Growth Offsets Decline in Resource Expansion in Global Agriculture**
   http://www.ers.usda.gov/AmberWaves/September10/Features/GlobalAgriculture.htm

The food price spike that occurred in 2008 prompted widespread debate about whether increasing world food demand was leading to food shortages. Common culprits mentioned besides demand itself, were low agricultural productivity and high energy prices. While productivity growth, even from a reliable long-run perspective is seen to vary from one country and region to another, the overall trend has been productivity rising and offsetting declines in several inputs used in production. In this case, the **accuracy** of the data used in the ERS analysis was enhanced by adjustments made to improve its comparability across regions. This **accuracy** added to its value by making better comparisons across regions possible. One source of the controversy that still continues is that in some cases data from one region is collected in a different context than data from another region. Attempts have been made to compare data from one region with that of another without researchers being fully aware that they were comparing apples to oranges. A common way that this occurs is that a new study may make innovations in collection or presentation that may not be equally represented in other studies when comparisons are made.

3. **The Role of Agriculture in Reducing Greenhouse Gas Emissions**
   http://www.ers.usda.gov/Publications/EB15/

Climate Change negotiations and legislation including recent meetings in Copenhagen and Cancun, have tip-toed around difficult questions concerning which economic sectors in which countries might be required to reduce their emissions of Greenhouse Gases. Most sectors lose something if they are forced to cut back emissions, thereby making it difficult to get concrete commitments and even **unbiased** analysis of the potential costs to an industry. A recent ERS report agrees that there would be costs of reducing emissions for U.S. agriculture through cropping practices. However, the report also points out that carbon offsets and incentive payments can encourage rural landowners to pursue climate-friendly alternatives like planting trees and other fast-growing perennials that combat climate change. The extent to which farmers adopt such activities would depend on a number of factors in addition to policy incentives including the final costs of the alternatives, potential revenues, and other economic incentives. What makes this type of **unbiased** analysis particularly valuable is that rather than presenting the viewpoint from one segment of the agricultural sector, it makes a broader industry-wide statement informing the reader about the costs and benefits of options available.

4. **Broadband Internet's Value for Rural America**
   http://www.ers.usda.gov/Publications/ERR78/

Access to high-speed internet connections can make-or-break the usefulness of information technologies for use in rural communities. Telemedicine and telehealth, distance education, and social services in general rely on high-speed internet connections for web-page downloads; otherwise, people may become discouraged and stop accessing them. The technologies themselves that become available on the web change rapidly and **timeliness** is the issue contributing the most to the value of this piece of ERS analysis. This project obtained critical data from the Federal Communications Commission and USDA's National Agricultural Statistical Service, while also drawing on the publicly available Census of Agriculture (produced every five years) and the Agricultural Resource Management Survey (ARMS). A workshop on the broadband topic was held at ERS in September, 2008 and the final report was out 11 months later. In rapidly changing fields in particular, **timeliness** adds value to the analysis that was made publicly available in printed form and on the web.

5. **Public Information Creates Value**
   http://www.ers.usda.gov/AmberWaves/April06/Features/Public.htm

There is a fair amount of overlap between the four factors considered for their contribution to the value of the previous reports and analysis discussed above. For one report, **accuracy** was quantified and valued. During a recent fungal crop-disease threat, USDA developed a web-based framework of information for farmers, federal and state agencies, and extension offices that could be used for informed crop management decision-making in response to the disease threat. The web-site gave detailed, **timely** forecasts of whether the spread of the disease was likely to reach specific growing areas that were updated daily. Profits of soybean producers in 2005 were estimated to be $11 million higher when the USDA information was accurate enough to resolve 20% of the infection uncertainty and almost $300 million when 80% was resolved. There were several other industry sources of disease information available on the web at the same time, but the USDA site was seen as an **unbiased** source of information tending not to stress the precautionary advantages of preventive fungal spraying.

These are five examples of agricultural economic research highlighting some of the factors that can influence the value of publicly provided data and analysis. These factors include; quality, accuracy, unbiasedness and timeliness.

Appendix of Sources

Food Security Assessment, 2010-20

By Shahla Shapouri, Stacey Rosen, May Peters, Felix Baquedano, and Summer Allen

Outlook Report No. (GFA-21) 64 pp, July 2010

Food security in 70 developing countries is estimated to have improved between 2009 and 2010, in part due to economic recovery in many of these countries. The number of food-insecure people in the developing countries analyzed by ERS researchers is estimated to decrease about 7.5 percent from 2009 to 882 million in 2010. The number of food-insecure people at the aggregate level will not improve much over the next decade, declining by only 1 percent. While there will be notable improvements in Asia and Latin America, the situation in Sub-Saharan Africa is projected to deteriorate after 2010. Food-insecure people are defined as those consuming less than the nutritional target of 2,100 calories per day per person.
http://www.ers.usda.gov/Publications/GFA21/

Accelerated Productivity Growth Offsets Decline in Resource Expansion in Global Agriculture

The rate of growth in global agricultural productivity has accelerated in recent decades and accounts for an increasing share of expanding agricultural production.

By Keith O. Fuglie

- Rapid increases in agricultural commodity prices during 2006-08 raised concerns that agricultural productivity growth may not be keeping up with increasing demand for agricultural commodities.
- ERS has developed a new index of total factor productivity (TFP) in global agriculture to provide a more comprehensive understanding of longrun sources of agricultural output growth.
- ERS research shows that the average rate of growth in global agricultural TFP has accelerated in recent decades and accounts for an increasing share of growth in agricultural production. Faster TFP growth has offset declining growth in agricultural land, labor, and other resources, although TFP growth across countries and global regions remains unevenly distributed.

http://www.ers.usda.gov/AmberWaves/September10/Features/GlobalAgriculture.htm

The Role of Agriculture in Reducing Greenhouse Gas Emissions

By John Horowitz and Jessica Gottlieb

Economic Brief No. (EB-15) 8 pp, September 2010

Agriculture could play a prominent role in U.S. efforts to address climate change if farms and ranches undertake activities that reduce greenhouse gas (GHG) emissions or take greenhouse gases out of the atmosphere. These activities may include shifting to conservation tillage, reducing the amount of nitrogen fertilizer applied to crops, changing livestock and manure management practices, and planting trees or grass. The Federal Government is considering offering carbon offsets and incentive payments to encourage rural landowners to pursue these climate-friendly activities as part of a broader effort to combat climate change. The extent to which farmers adopt such activities would depend on their costs, potential revenues, and other economic incentives created by climate policy. Existing Federal conservation programs provide preliminary estimates of the costs of agricultural carbon sequestration.
http://www.ers.usda.gov/Publications/EB15/

Broadband Internet's Value for Rural America

By Peter Stenberg, Mitch Morehart, Stephen Vogel, John Cromartie, Vince Breneman, and Dennis Brown

Economic Research Report No. (ERR-78) 70 pp, August 2009

As broadband—or high-speed—Internet use has spread, Internet applications requiring high transmission speeds have become an integral part of the "Information Economy," raising concerns about those who lack broadband access. This report analyzes (1) rural broadband use by consumers, the community-at-large, and businesses; (2) rural broadband availability; and (3) broadband's social and economic effects on rural areas. It also summarizes results from an ERS-sponsored workshop on rural broadband use, and other ERS-commissioned studies. In general, rural communities have less broadband Internet use than metro communities, with differing degrees of broadband availability across rural communities. Rural communities that had greater broadband Internet access had greater economic growth, which conforms to supplemental research on the benefits that rural businesses, consumers, and communities ascribe to broadband Internet use.

http://www.ers.usda.gov/Publications/ERR78/

Public Information Creates Value

A case study of the USDA Soybean Rust Coordinated Framework finds that the value of the information provided by the framework exceeds its cost.

By Michael J. Roberts; David Schimmelpfennig

Scott Bauer, USDA/ARS

- With accurate information, individuals can make sound decisions that allow them to adjust their actions to the situation at hand. Information comes from many sources, but the value of publicly provided information is often underestimated.
- For farmers who are trying to react to a potential pest infection, such as soybean rust, information about the likelihood of infection can help them to make better decisions about the amount and timing of fungicide applications, which will ultimately increase their profits.

http://www.ers.usda.gov/AmberWaves/April06/Features/Public.htm

White Paper submitted for the Digital Library for the Maghreb Workshop
Held in Washington, DC, January 24-25, 2011

Digital Libraries in Online Professional Development Communities: the Rwanda Education Commons

Melissa Beuoy and Robert Schware
Academy for Educational Development
mbeuoy@aed.org; rschware@aed.org

Background

The Global Learning Portal (GLP) is a multi-stakeholder alliance launched by USAID and the AED to improve education outcomes in developing countries through the use of collaboration technologies. The core strength of the GLP is its capacity to establish strong professional development communities. Such communities can improve teaching and learning practices by (1) expanding access to quality materials, (2) promoting the exchange of ideas, and (3) reducing teacher isolation. GLP country-level communities (e.g., in Afghanistan and Rwanda) are usually supported with a variety of secondary activities addressing gaps in content, capacity, and infrastructure.

GLP's Rwanda Education Commons (REC) aims to help Rwanda expand access to quality education through the use of information and communication technologies (ICTs). It realizes this goal by improving the climate for collaboration in the use of ICTs in education, and by implementing activities that use ICTs to supplement teaching and learning. In addition to working with the Ministry of Education on collaboration, policy implementation, and capacity building, REC has focused on developing and acquiring quality learning materials and methods of distribution. In addition, REC coordinated and rolled out a low-cost connectivity solution for Rwanda's teacher training colleges, and distributes materials via several offline channels.

The REC portal (http://www.educationcommons.rw/) is an online gathering place for a growing community of educators in Rwanda. Educators visit the portal to share ideas and good practices, find high-quality educational materials, and connect with each other. GLP has partnered with Google engineers, researchers, and designers to adapt Google apps, tools and technologies for a teacher-relevant portal in the country.

Digital libraries

A key component of the REC portal is its digital library, which aims to provide high-quality educational resources to Rwandan teachers, students and policymakers. Designed specifically with Rwandan educators in mind, the REC library is browsable by topic (based on the Rwanda curriculum and other topics of interest) to assist ESL and low computer literacy users and keyword searchable for more advanced users. Based on input from teachers and user testing performed in Rwanda, the GLP and Google teams redesigned the site to be more user friendly. Each resource entry includes a title, a brief description, its source, the year it was published (since the curriculum changes frequently), and appropriate grade level, and resources relevant to each other can be clustered together. Libraries are also sorted by audience (e.g., teacher, policymaker). Additional functionality will soon be incorporated, such as resource ranking, comments, and an "add to my library" feature to promote user interaction with the resources and each other.

The library strives to be much more targeted than a general web search, but not so specific as a Rwandan school library. The resources in the library vary from educational YouTube videos to lesson plans written by Rwandan teachers to UNESCO reports on girls education. Many resources are specific to the Rwandan curriculum as they were developed by Rwandan teachers; however, more general articles on pedagogy, classroom management, and global education issues are available as well.

REC partners with various organizations to acquire and/or adapt educational materials, such as those from South African Institute for Distance Education and Teacher Education in Sub Saharan Africa. REC has also created a YouTube channel (www.youtube.com/user/EducationCommonsRW?feature=mhum) to host 350 videos donated by Mindset Network SA which target Secondary 10th and 11th (SA) grades and cover Math, Sciences, and English. While the channel is open to the public, the videos are integrated into REC's digital library as well. Presently, the library resources are vetted for quality; in the future, the library will accept user-contributed resources to promote user ownership of the site and to promote a sense of professional community.

The GLP/Google team is developing an online platform that can easily be re-deployed to other education communities or sectors.

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Establishment of Digital Library as a means of Preserving Cultural Heritage. a case of Ethiopia

Helen Weldeargeay Tekulu from Ethiopia

ERASMUS MUNDUS student of International Mater in Digital Library
Learning (DILL)

helenwts@yahoo.com, helenwts2@gmail.com

Oslo, Norway

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1. Introduction

Ethiopia has several tangible and intangible cultures, languages, traditions and histories. In addition every state of Ethiopia has there own traditional way that are wonderful and unique in the world. Generally Ethiopia is the richest country owing different cultures that attract visitors, but still there are a lot of hidden cultures and histories that are not yet discover.

Now a days Ethiopia is one of the most listed in UNESCO (United Nations Educational, Scientific and cultural organization) world heritage site. The eight Ethiopian cultural heritage listed in UNESCO are Aksum, Fasil Ghebbi Gonder Region, Harar Jugol-the Fortified Historic Town, Lower Valley of the Awash, Lower Valley of the Omo, Rock- Hewan Churches:Lalibela, Simien National Park and Tiya are the most Ethiopian cultural heritage. UNESCO helps and works with different Africa countries to preserve their precious culture and histories for the coming generation. In addition UNESCO encourages young people to learn, know, protect and preserve their own cultural heritage.

Preserving and accessing cultural heritage, ancient histories by a means of digital library is main solution for long-lasting accessibility and usability by the present and coming generation. So histories, cultures and traditions are primary target of the digital preservation. Like churches, mosques, monasteries photo; icons, wall paints, manuscripts, artworks; palaces, ancient buildings, different types of stones; Music, musical instrument, dancing and their traditional dressing style and other ceremonies are the most relevant point need attention.
Accordingly preserving and protecting those types of culture in digital form and duplicating them in so many copies as well as make open to people all over the world will assure the accessibility of the resource to recycle from generation to the next generation.
Let's take some example of very special and unique custom of Ethiopia. Mostly they are known as the holy places of Christianity St. Mary of Zion Church,Axum; Rock-Hewan Churches , Lalibela; Abreha We Atsbeha near Wukro, Rock-Hewan churches,Gera-Alta and yeha .

1.1. St. Mary of Zion Church

St. Mary of Zion Church is the most known church of Christianity in Ethiopia. The **Church of Our Lady Mary of Zion** (Amharic: ርዕሰ አድባራት ቅድስተ ቅዱሳን ድንግል ማሪያም ፅዮን *Re-ese Adbarat Kidiste Kidusan Dingel Maryam Ts'iyon*) of the Ethiopian Orthodox Church is the most important church in Ethiopia.[1] King Ezana the first emperor of Ethiopia built in the church at fourth century AD. The church demolished during the tenth and sixteenth century by the dominant period and rebuilt during the seventeenth century. The most visited day by the Christian society is during the holiday of St. Mary of Zion *Hedar* 21 (November 29).[2]

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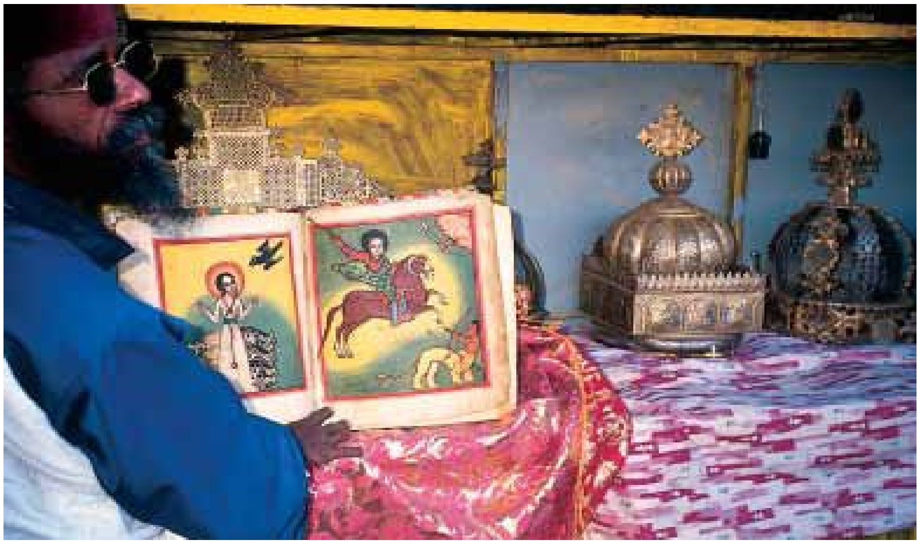
[1] http://en.wikipedia.org/wiki/Church_of_Our_Lady_Mary_of_Zion

St. Mary of Zion Church



Icon and wall paint of St. Mary of Zion Church

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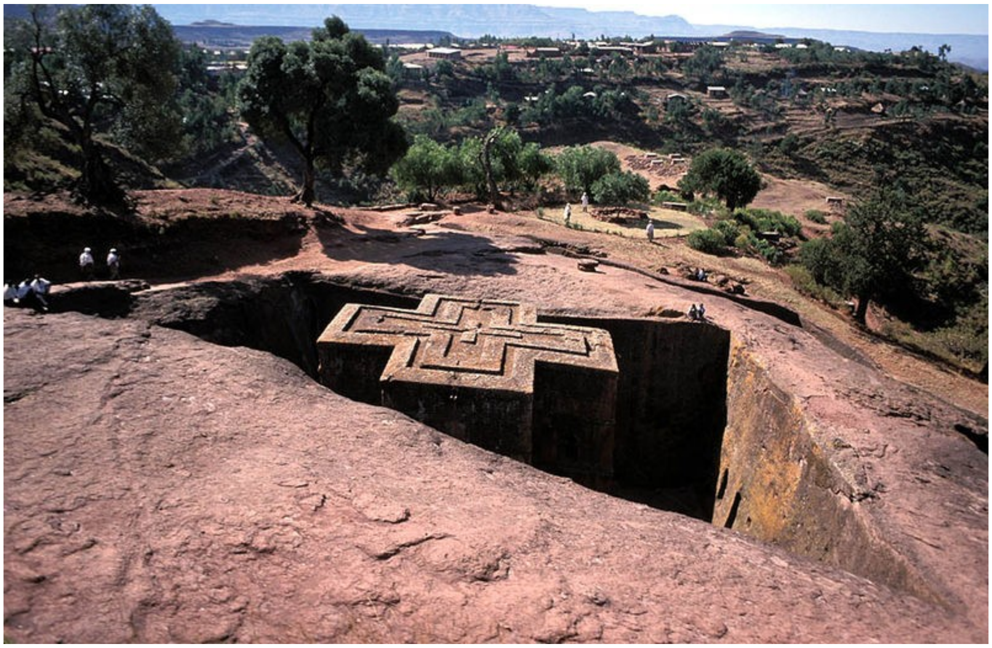
[2] The church is in the town of Axum in the Tigray Province. Since its founding during the episcopacy of Frumentius (known in Ethiopia as *Abune Selama Kesatay Birhan* or "Our Father of Peace the Revealer of Light") the Church of Mary of Zion has been destroyed and rebuilt at least twice. Its first putative destruction occurred at the hands of Queen Gudit during the 10th century. Its second, confirmed, destruction occurred in the 16th century at the hands of Ahmad ibn Ibrihim al-Ghazi, after which it was rebuilt by the Emperor Gelawdewos, then further rebuilt and enlarged by Fasilides during the 17th century.

1.2. Rock-Hewan Churches

Rock-Hewan Churches, Lalibela is also the most known church next to Axum church. This church is found in the Lalibela, Amhara state of Ethiopia. This rural town is known around world for its monolithic churches by building church by carving natural rock. There are 13 churches, assembled in four groups. Bet Medhane Alem is believed as the largest monolithic church in the world.[3]



Rock-Hewan Church in Lalibela

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[3] The Northern Group: Bet Medhane Alem, home to the Lalibela Cross and believed to be the largest monolithic church in the world, probably a copy of St Mary of Zion in Aksum. It is linked to Bete Maryam (possibly the oldest of the churches), Bete Golgotha (known for its arts and said to contain the tomb of King Lalibela), the Selassie Chapel and the Tomb of Adam.

The Western Group: Bete Giyorgis, said to be the most finely executed and best preserved church.

The Eastern Group: Bete Amanuel (possibly the former royal chapel), Bete Merkorios (which may be a former prison), Bete Abba Libanos and Bete Gabriel-Rufael (possibly a former royal palace), linked to a holy bakery.

Bet Giyorgis Church in Lalibela

1.3. Yeha

Yeha is also known as Ethiopian Orthodox monastery. It is one of the most scared sites of Ethiopia located on a small hill with a mountain behind, believed to date from 500 B.C and there is also incredible rectangular stone temple. (Hodd, 2002)

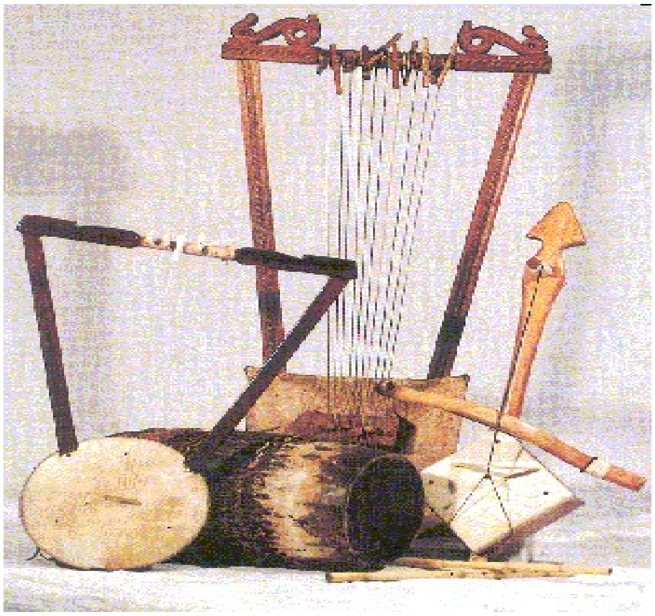
1.4. Aberha We Atsbeha

Aberha We Atsbeha Church is located in the west part of Wukro,Tigray. It is the most outstanding work of creative artistic and decorated paints. "It is the target of a main pilgrimage on 4 tekemt (14 October) and it is one of the nine churches known to westerners before 1966". (Briggs & Blatt, 2009)

At this moment these cultural and historical churches are the most attracted and visited places by all over the world. In addition, these churches are seeking and struggling to preserve their culture to the coming generation. So to prevent the ancient books, paints and manuscripts from losing, destroying, stealing and other problem digitizing is helpful.

1.5. Music

On the other hand Ethiopia also has different traditional music in each of eighty ethnic groups. They have their own singing procedure and they used traditional music instruments like *Krar, Begena,kbero,* and *Massinko*. This amazing type of music keeping and accessing through digital library is open chance to know different music types and introduce accessibility of the resources every where at any time.



Traditional music instrument of Ethiopia

Example of: - Ethiopian Music with the different dances as well as dress style.
http://www.youtube.com/watch?v=N8A3VmVKOR0&feature=related(*Tibebu Workeye---Emma Ethiopia*, 2006)

2. Objectives

Keeping the history and identity of the country as well as preserving and organizing the original resource will help to disseminate digital information every where to everyone. Digital library opens wide opportunity for those who want to know more about culture specifically for those who seek out to discover and visit like archaeologist, students, tourists and others.

So the objective of this paper is:

- To explore basic principles of establishing digital library for cultural heritage
- To ensure long term preservation, transformation and seamless accessibility of cultural heritage
- To Disseminate resources in terms of digital object from present user to coming
- To handle the difficulty of digitization and conversion of rare manuscripts or ancient books etc…

And to answer questions:
What are the basic principles to establish digital library?
How do we build reliable digital library software to preserve cultural heritage?

3. Principles to Establish Digital Library

3.1. Financial Strength

When ever planning to establish digital library the first thing come to our mind is financial strength of the country, asking questions if the finance making the project active and continuous through the life of digitizing process is wiseness. In Africa there is an obstacle that makes them behind and still they are struggling with general poverty. Because of this reason African people are not yet reaching the latest technology as like as the other developed countries.

How many of African people are struggling to survive because of lack of finance?
How many of African people are suffering and lagging behind because of lack of information? That is the main question need response.
They want you to lend them your hand in order to get them out from the dark way of living to the luminosity. So financial issue need more attention form the beginning to the last of the establishment process.

3.2. Infrastructure

There are equipments alleviate the project as starting point such as server, Storage, Computers, Scanners, Digital camera etc are necessary and serve as main tools for digital library.
Further more assuring the continuity of electric Power or making ready power supply generator as well as internet connection and network will fix the problem of interruption during the testing time.

3.3. Content

How about content? Elaborating and organizing the content is vital. The challenging part is the conversion quality of rare manuscript, ancient book with different language like Geez are unusual and might be happen strange occasion during assigning standard metadata. To organize and keep the original quality of the ancient books, wall painting, manuscript, artwork and related document is advisable to work with experts, archivists, archaeologist as well as with governmental and non governmental organization like UNESCO who woks for and supports cultural heritage of different countries. So it's not only advisable and it's the sloe solution to software developer to make their process faster and acceptable by end user.

3.4. Preservation schemes and UNESCO Charter

Since the aim of preserving is linking historical and cultural heritage of the previous and the current to the future as well as to protect and make them long-lasting accessible all over the world. Following some basic strategies and charter of UNESCO is essential. There are five basic preservation schemes.

> *"Printing to paper or microfilm*
> *Preserving hardware and software in museums and archives*
> *Duplicating content far and wide*
> *Emulating hardware and software*
> *Migrating systems to newer versions."* (Witten, Bainbridge, & Nichols, 2009,page 416)

As Witten state the 1st and 2nd are not consider as long term preservation since they may expose to different problem like lost or vanish the records. 3rd one is having more replication of the original source is save from losing or missing the document. When you lost one copy, you have another chance to access the other alternative copy. The fourth one need special software that read the old one and translate to new one with holding original format of the document and the last one transform or change from the existing type or system to new one from the old physical or logical to new type or version .

(McCray & Gallagher, 2001) points that "migration strategy" as a means of transforming data from one software or physical or different format to another will help institution persistently and seemingly with out interruption, refresh its collection to preserve for the coming technology. Likewise(Rothenberg, 1999) put as solution for preservation problem "emulation" techniques of obsolete systems on future, unknown systems so that digital information will be accessible and can be run in any new technology coming for the future.

In General copying, converting from the out date system to new, transforming and translating from the obsolete to the new is keeping the life cycle of the document to the next. These basic procedures are important during the preservation cultural heritage in digital object.

Further more the main point also we should consider and follow the charter of UNESCO during the establishment and preservation time. Here are the some articles:-

UNESCO declared and adopted twelve articles during 32nd session "Charter on the Preservation of Digital Heritage" during the general conference on 17-9-2003.

"The digital heritage as a common heritage

Article 1 – Scope

The digital heritage consists of unique resources of human knowledge and expression. It embraces cultural, educational, scientific and administrative resources, as well as technical, legal, medical and

other kinds of information created digitally, or converted into digital form from existing analogue resources. Where resources are "born digital", there is no other format but the digital object.
Many of these resources have lasting value and significance, and therefore constitute a heritage that should be protected and preserved for current and future generations. This ever-growing heritage may exist in any language, in any part of the world, and in any area of human knowledge or expression.

Article 2 – Access to the digital heritage
The purpose of preserving the digital heritage is to ensure that it remains accessible to the public. Accordingly, access to digital heritage materials, especially those in the public domain, should be free of unreasonable restrictions. At the same time, sensitive and personal information should be protected from any form of intrusion.

Guarding against loss of heritage

Article 3 – The threat of loss
The world's digital heritage is at risk of being lost to posterity. Contributing factors include the rapid obsolescence of the hardware and software which brings it to life, uncertainties about resources, responsibility and methods for maintenance and preservation, and the lack of supportive legislation.

Article 5 – Digital continuity
Continuity of the digital heritage is fundamental. To preserve digital heritage, measures will need to be taken throughout the digital information life cycle, from creation to access. Long-term preservation of digital heritage begins with the design of reliable systems and procedures which will produce authentic and stable digital objects.

Measures required

Article 6 – Developing strategies and policies
Strategies and policies to preserve the digital heritage need to be developed, taking into account the level of urgency, local circumstances, available means and future projections. The cooperation of holders of copyright and related rights, and other stakeholders, in setting common standards and compatibilities, and resource sharing, will facilitate this.

Article 8 – Protecting the digital heritage
Member States need appropriate legal and institutional frameworks to secure the protection of their digital heritage. As a key element of national preservation policy, archive legislation and legal or voluntary deposit in libraries, archives, museums and other public repositories should embrace the digital heritage.
Article 9 – Preserving cultural heritage
The digital heritage is inherently unlimited by time, geography, culture or format. It is culture-specific, but potentially accessible to every person in the world. Minorities may speak to majorities, the individual to a global audience.
The digital heritage of all regions, countries and communities should be preserved and made accessible, so as to assure over time representation of all peoples, nations, cultures and languages."
(Unesco, 2003, page 80-82)

3.5. Manpower

Who are the main participants during the establishment of digital library? The main players are Information Technology specialist, Computer scientists, Librarians, archivists and related professionals. Moreover involving, consulting and inviting people who have more experience in formulating or creating digital library also helpful.

On the other hand exchanging experience sharing from model countries, giving short and long term training to the professionals of that country help the developer to go smoothly as well as help for upgrading, maintaining and implementing during and after the completion.

3.6. Users

Who is going to accesses your data? Thinking about end user is also wise and advisable. Society, community people all over the world at large this is up to you. The decision might depend in the country policy and strategy, content and the strength of the system capacity and reliability. However, understanding and knowing their awareness and needs of the society will assist you to do quality task.

3.7. Digital Library Software

These types of software are free for users who want to build, maintain, implement and manage digital libraries. The most well-known and useable software in developed and developing countries are Greenstone, Dspace, E-print and Fedora etc. Those types of software help librarians or non librarians to install and use for preserving, organizing and accessing relevant information. In addition they have many opportunities for users to access, navigate, search and browse collection with out asking more effort and skill. So in my opinion software that are open to modify, install and use it for creating and building digital library is recommended and will serve for experts as starting point.

3.8. Language

In most countries including Ethiopia who are using and implementing digital library are use English language as the main means of communication channel. This may have impact in people who are not capable to understand their resource using English language only. Therefore it is very crucial and helpful to have multi language in the system. Open source software like Greenstone has options to view the librarian interface and documentation using several languages as well as reader's interface is available in 50 different languages. Example Amharic language (Ethiopia) is now available in Greenstone so users who want to see Amharic can possibly access the available collection.

3.9. Copy Right Issue

Copy right and patent law issues are the main challenge or concern for digital libraries. These issues are the roadblock for digital preservation. Thinking about intellectual property making cooperation and negotiation might help for developing country.

4. Conclusion

In order to resist the improvement and rapid evolution of day to day technology we should build our system that will be reliable, accessible and interoperable every time. This type of system will be capable and compatible with latest technology and environment. "Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime". Chinese proverb gives me a brief way to write something that when we create or build a digital library lets allow Africans people to participate in the project, lets give them long term training that will help them to modify, update their own system ,lets teach them how to face up problems, lets teach them how to innovate new things . Then they will start to go under their own steam.

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Digital Library and Archives developments in Africa

Ubogu, F & Pickover, M
University of the Witwatersrand, Johannesburg
Felix.Ubogu@wits.ac.za; Michele.Pickover@wits.ac.za

Introduction

Digitisation and the development of digital libraries have taken centre stage in the efforts of many developed and developing nations to make available on the Web national cultural and scholarly heritage. The digitised content and digitally preserved materials of archives, museums and libraries, particularly in developed countries, is widely available. These institutions, by converting their 'analogue' collections into digital form are creating exciting and new opportunities for improved and convenient access to these resources.

Throughout Africa projects are also under way to create virtual libraries and archives and to build a digital heritage continuum in Africa. These digital initiatives seek to make the scientific, archival and cultural resources of the institutions available for all. However, current digitisation efforts within most regions of Africa are fragmented, with little national or regional coordination. In addition, most of these initiatives are undertaken by individual institutions with hardly any collaborative efforts. There are no national or regional initiatives to develop strategies and policies or coherent national digital libraries and archives that would provide integrated access to the digitised collections of libraries, archives and museums across each country and the continent at large.

The First International Conference on African Digital Libraries and Archives (ICADLA-1) which was held in the United Nations Conference Centre, Addis Ababa, Ethiopia, on 1st–3rd July 2009, provided a platform for the discussion on policy frameworks, projects and notions of partnerships in relation to the digitisation of African heritage and resources.

The outcome of the conference was a "Declaration and Recommendations on knowledge for development in Africa and the digitization of African knowledge and heritage". One of the key recommendations was that an African Digital Library and Archives Programme should be established and that this programme should spearhead the formulation of comprehensive policies, a strategic framework and a road map for digital libraries and archives on the African continent. The proceedings the conference is available at: http://wiredspace.wits.ac.za/handle/10539/8917

The conference participants also recommended that the African Union (AU) was the appropriate body to host an African Digital Library programme and that such an initiative could only be effectively accomplished with AU collaboration and support.

An African Digital Library and Archive programme

African countries need to develop digital library strategies to direct the establishment of national infrastructures for preservation and permanent access to digital information in the country/region. Each country needs to build a detailed picture of the current situation.

An African Digital Library and Archive programme, under an appropriate body such as the African Union, can facilitate collaborative initiatives on various aspects of digital library development including: national and institutional digitisation audits; policy development; national and institutional level policy frameworks and guidelines; intellectual property strategies; and proposals for building local capacities and digital preservation plans among others.

An African Digital Library and Archive Project would give practical support to “a culture of diffusion of assets” in Africa by financing, or seeking funds to finance, a number of key digitisation projects of particular historical and very large cultural relevance. Such projects would become the basis for the deployment of advanced digital services such as the verification and certification of trusted digital repositories; the stimulation of ICT enterprises and software development connected with digital libraries; and the development of synergies between research programmes concerning digital libraries and the industrial sector.

An African digital library initiative should aim at digitising, preserving and providing online access to the continent’s cultural heritage. Such an initiative would:

- Make the historical cultural resources of African institutions easier and more interesting to use in an online environment;
- Represent test-beds for implementations of standards;
- Provide a ready to use solution to countries and institutions that plan to start a digitisation project;
- Contribute to the creation of national/regional portals and gateways which could integrate digital initiatives and services and offer a single point of access to the continent’s cultural heritage;
- Contribute in the dissemination of best practices and guidelines thus facilitating cooperation and standards sharing;
- Establish the platform for the creation of a national system of trusted digital repositories.

Developments in South Africa

A national digitisation initiative in South Africa is Digital Innovation South Africa (DISA). It attracted in a number of heritage and research stakeholders from government, tertiary institutions, libraries and archives. DISA grew out of a workshop on digital imaging sponsored by the Andrew W. Mellon Foundation and held in Johannesburg in September 1997. The first phase of the DISA project was entitled *South Africa’s Struggle for Democracy 1960-1994* and began in 1999. It has made accessible via the World Wide Web, South African material of socio-political interest. It focused on runs of serials (in some cases of short-lived and of poor typographical quality) spread within library and archive collections around the country. The three decades covered by the serial literature selected by DISA related to local resistance movements to apartheid and covered approximately forty titles which covered a varied spectrum of anti-apartheid political organisations.

In 2002 DISA sought to complement this first phase of digitising journals of the liberation struggles. The original intention of this second phase (DISA 2) was to build on the serialised digital resource through archival content about the liberation struggle. The identification and selection of content was to be centred round the efforts of local scholars. This second phase began in 2003 and is entitled *Southern African Freedom Struggles, c.1950-1994*.

DISA was firm on its insistence on the use of open source software and platform independence so as to provide a model that is appropriate to the African context. In addition to developing content, DISA has contributed to the enhancement of local knowledge in digital imaging and is also playing an advisory, advocacy, training, and research and development role.

In South Africa, the National Research Foundation (NRF) is collaborating with the Committee for Higher Education Librarians of South Africa (CHELSA) in establishing a national Electronic Theses and Dissertations (ETD) portal with discovery and access services, and possibly archival services. The project would lead to the harvesting of metadata and full-text for long-term preservation.

With sponsorship from Carnegie Corporation of New York, the NRF recently commissioned an audit of ongoing and planned digitization initiatives in South Africa. The audit was the "first phase of an extensive exploration of the national development needs for effective and efficient digitisation and preservation of valuable heritage and research collections in the South African system". The NRF is working on producing a South African Framework for managing digital collections.

Second International Conference on African Digital Libraries & Archives (ICADLA-2)

A second conference, ICADLA-2, is planned for November 2011 in South Africa. The conference will provide a forum for African Institutions to:

- Access and examine options for capacity development in all strategic areas of digitisation;
- Strengthen existing and build new networks and linkages necessary for knowledge sharing in the area;
- Understand the strategic and management issues of developing digital resources from digitisation to delivery.
- Develop national digitisation programmes and strategies aimed at establishing the required digitisation infrastructure for access to and long term preservation of African scholarly and cultural digital content.

The format of ICADLA-2 will be a three-day training workshop designed for leaders and decision makers and a two-day strategic digitisation project and programme planning conference.

White Paper submitted for the Digital Library for the Maghreb Workshop
Held in Washington, DC, January 24-25, 2011

WorldWideScience.org: Narrowing the Digital Divide in the Maghreb

Walter L. Warnick, Ph.D.
Director, Office of Scientific and Technical Information
U.S. Department of Energy
Walter.Warnick@science.doe.gov

WorldWideScience.org is a global science gateway offering democratic access to the world's science and technology information. Countries in the Maghreb region of Africa are both beneficiaries of and contributors to the geographically-diverse scientific content accessible through WorldWideScience.org. Several of the Maghreb countries participate in the African Journals On-Line (AJOL) project, which is one of two African members to the WorldWideScience Alliance, a consortium of national government and government-sponsored organizations dedicated to enabling this pioneering, free access to the world's science knowledge. It makes the R&D results and related scientific and technical information published by government bodies of 70 countries searchable via a single query. It virtually integrates the world's leading open access science databases, including Science.gov, PubMed, UK PubMed Central, arXive, and about 200 other databases, and it returns search results in relevance rank order.

It searches about the same quantity of science as does Google, but there is minimal overlap between WorldWideScience and Google. As a measure of the uniqueness of WorldWideScience.org versus what can be found through searches on Google and Google Scholar, WWS.org search results typically have only a 3.5% overlap with search results from Google or Google Scholar -- or, in other words, its results are 96.5% unique. Its searches cover 400 million pages of science from major science-producing nations as well as numerous developing countries. Its use is entirely free.

To adequately understand the groundbreaking importance of WorldWideScience.org, it is necessary to explain the multiple barriers it has overcome. At a fundamental level, if a person has modern access to information -- that is, internet access -- then, there are still several remaining impracticalities. First, it's not likely that a single person is aware of all the scientific information sources around the world. And a simple search on Google or Bing won't reach or reveal large bodies of scientific information as these search engines covers only a small portion of them. Second, even if a person knows of many individual sources of scientific information, he is physically limited by time to search them sequentially. And, third, he is physically limited by time to sort through search results and find those most relevant to his search. WorldWideScience.org overcomes these three limitations by performing a simultaneous search of scientific databases in 70 countries. These databases are typically hosted by national libraries or national science agencies.

In addition to WWS.org being relevant to addressing the digital divide, widely-recognized technology gaps, and other topics of concern in the developing world, the Alliance has recently taken additional steps to further democratize access to scientific information. Specifically, in June 2010, Multilingual WorldWideScience.org was launched, which allows a user to enter search terms in one of any 9 languages (including French, widely spoken in much of the Maghreb), have the terms translated into the languages of native databases, and then have results translated into the user's selected language and ranked by relevance. While real-time translation such as this has been around for a short period, its use in a federated search engine, translating "one to many" languages and then "many to one" language is truly groundbreaking and provides speakers of those 9 languages unprecedented access to global scientific literature. By mid-2011, Arabic will be added to the multilingual WWS.org translations capability, further benefitting the Maghreb region.

WorldWideScience.org is financially supported by all the major US research agencies and by government information organizations in eight other countries. The WorldWideScience.org search engine is operated by the U.S. Department of Energy's Office of Scientific and Technical Information as the Operating Agent to the international WorldWideScience Alliance. The Alliance is chaired by Great Britain and Canada. It operates under the umbrella of the International Council for Scientific and Technical Information which is headquartered in Paris.

WorldWideScience.org, by (a) offering free and unprecedented access to scientific content to countries in the Maghreb and (b) representing significant Maghreb region scientific output (through AJOL's inclusion in WWS.org searches), essentially brings digital science library functionality to this part of the world community.

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Developing an Application Profile for Better Digital Resources Discovery and Access

Iman Weheba
Graduate Student, School of Information Science, University of Pittsburgh
Iaw5@pitt.edu

Abstract

This paper is adapted and modified from a group project[1] carried out at the School of Information Science, University of Pittsburgh. The group project members developed an application profile which includes four different metadata element sets: descriptive information, special format information (maps are used as an example), technical information, and rights management information. The proposed application profile intends to support better digital resources discovery and access through defining the users' tasks. These tasks were used in developing a set of functional requirements that respond to the users' needs.

Introduction

The purpose of any metadata is to support an activity. Defining clear goals for the application profile used to support that activity is an essential first step. Accordingly, the first step in developing an application profile is to identify the users and their requirements. The group identified three groups of users: the digital data curators or librarians, the general users, and special format users (GIS users) and created a list of objectives and functional requirements for each group of users.

Functional requirements can include general goals as well as specific tasks that need to support the needs of metadata creators, resource users, and application developers so that the resulting application fully supports the needs of the community. Accordingly, a set of functional requirements were developed based on the user tasks that must be supported by the metadata schema. We based our model on the Functional Requirements of Bibliographic Records (FRBR), which is developed by the International Federation of Library Associations (IFLA) and made some modifications to meet some specific users' needs.

While developing the scheme, the answers of the following questions were considered:

- What do we want to accomplish with our application?
- What are the limits of our application? What will it *not* attempt to do?
- How do we want the application created serve our users?

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[1] Eleanor Akyar, John Clark, Patty Fox, Laura Turowski, Iman Weheba (December 9, 2010). Maps Metadata Group Project (MMGP): A metadata scheme for digitized images of historical maps. Unpublished research presented as a partial fulfillment of the requirements of the Metadata Course at the School of Information Science, University of Pittsburgh

- Will our application need to perform specific actions, such as sorting, or entering data in particular formats?
- What are the key characteristics of our resources, and how does this affect our selection of data elements? For example, do we need to handle a variety of domain specific metadata element sets?
- What are the key characteristics of our users? Are they associated with a particular domain or are we serving a general public? Do they all need the same data? How expert are they in relation to the data our application will manage? How expert are they about the type of resources described?
- Are there existing standards that need to be considered?

Users' tasks and Functions

Librarians and curators

The librarians and curators are mainly responsible for assisting resource discovery, metadata creation, developing resource use and access policies, collection preservation, technical information management. The functional requirements should support fulfilling these responsibilities according to the following scenarios of user's tasks:

Task 1: Resource discovery

The metadata creation tasks involve searching and identifying whether a metadata record already exist for the item before creating a new record.

Functional requirements:

Support all resource discovery functions, such as searching for and identifying metadata elements that clearly distinguishes the item from other items.

Task 2: Metadata creation

Scenario: Metadata records creation:
Creating new record in accordance with the data elements definition in the application profile, all format controlled elements should be entered and validated according data format standards such as ISO date format, and all controlled vocabularies field sorted and displayed according to namespace values.

Functional requirements:

Identify: Identify a record, segment, field, or data element (i.e., to differentiate one logical data component from another).
Process: Process a record, segment, field, or data element (i.e., to add, delete, replace, output, etc. a logical data component by means of an automated or manual process), and support data validation according to the standard format.
Sort: Sort a field alphabetically or numerically according to namespace, for example sort the subjects according to the source of term, such as Library of Congress Subject Heading (LCSH), Art and Architecture Thesaurus (AAT), or Thesaurus of Geographic Names (TGN), etc.

Display: Display a field or data element (i.e., to display a field or data element with the appropriate data format style or pre-defined display constants).

Task 3: Developing resource use and access policies

Scenario: Identify and record the copyright information including information about access restrictions, copyright status and information about the rights holder.

Functional requirements:

- Identify and record the copyright status of the digital resource, whether it is still under copyright or in the public domain
- Name the current rights holder
- Provide a copyright statement that tells the user of the digital object what they are allowed to do with the digital resource.
- Include citation to provide proper attribution to the owner or keeper of the resource.

Task 4: Technical information management

Scenario 1: Recording and identifying technical information about the digitization techniques used for producing scanned images of the resource.

Functional Requirements

- Provide information on the size and type of the electronic file and the software or hardware required to access it.
- Include information about the scanning of the original object, including the equipment/hardware used for scanning
- Show the location (website) of the object

Task 5: Collection preservation

Scenario: Identifying the physical condition of the original recourse and digital preservation (scanning date) which will enable handling periodic restoration and digital preservation management routines.

Functional requirements:

- Describe the physical condition of the original resource
- Provide the scan date of the digital resource

General users

The general users will need to fulfill the following tasks:

Resource Discovery

Search: Search for a resource corresponding to stated criteria (i.e., to search either a single entity or a set of entities using an attribute or relationship of the entity as the search criteria).

Identify: Identify a resource (i.e., to confirm that the entity described or located corresponds to the entity sought, or to distinguish between two or more entities with similar characteristics).
Select: Select a resource that is appropriate to the user's needs (i.e., to choose an entity that meets the user's requirements with respect to content, physical format, etc., or to reject an entity as being inappropriate to the user's needs).
Obtain: Access a resource either physically or electronically through an online connection to a remote computer, and/or acquire a resource through purchase, license, loan, etc.

Resource Use

Restrict: Control access to or use of a resource (i.e., to restrict access to and/or use of an entity on the basis of proprietary rights, administrative policy, etc.).
Manage: Manage a resource in the course of acquisition, circulation, preservation, etc.
Operate: Operate a resource (i.e., to open, display, play, activate, run, etc. an entity that requires specialized equipment, software, etc. for its operation).
Interpret: Interpret or assess the information contained in a resource.

GIS Users

The functional requirements for GIS users are based on map discovery, use of map images in GIS applications and understanding data quality. To this end our metadata schema addresses these needs based on the following tasks:

Task 1: Map discovery

Map discovery is enhanced by the spatial indexing of resources using bounding boxes found the metadata Spatial Coverage. A two-dimensional database allows topological searches beginning with a desired location and using spatial search terms such as is contained within, is adjacent to, overlaps with, and others to discover the bounding boxes of each resource and return these resources to the map user. Spatial queries can be combined with more traditional one-dimensional queries to produce queries such as which maps spatially contain the state of Pennsylvania and feature Rivers?

Functional Requirements

Search: Search for the map according to stated criteria
Identify: Identify and confirm the map (i.e., to confirm that the map described or located corresponds to the map sought, or to distinguish between two or more maps with similar characteristics).
Select: Select a map that is appropriate to the user's needs (i.e., to choose a map that meets the user's requirements with respect to content, physical format, etc., or to reject a map as being inappropriate to the user's needs).
Obtain: Access the map either physically or electronically through an online connection to a remote computer, and/or acquire a resource through purchase, license, loan, etc.

Task 2: Map image use in GIS Applications

Any digital image may be displayed in GIS software. However it will not be useful unless it can be accurately overlaid with other geospatial datasets. For instance an environmental scientist may want to overlay the image of 1910s map with a layer of 1950s aerial photography of the same area, as well as a 1990s satellite image in order to analyze land use/land cover change over many decades.

First the digital image of the map has to be geo-rectified using control points from some known positions such as road intersections. This GIS method will convert a simple image file such as jpeg or TIFF to an image file with geographical information. Simply by tagging the lower left-hand pixel with a latitude and longitude value, all GIS applications will be able to locate the image on the surface of the earth. Next the image must be transformed into the same geodetic (3-D) model and (2-D) map projection as the other datasets the analyst wants to overlay. If they are not in the same projection then the features can be off by hundreds if not thousands of meters depending on the scale at which the image represents the surface of the earth.

Functional requirements:

Restrict: Control access to or use of the map image (i.e., to restrict access to and/or use of access control information for identifying proprietary rights, administrative policy, etc.).
Operate: Operate a resource (i.e., to open, display of the map image which requires special equipment, software, etc. for its operation).

Task 3: Assessing Data Quality

Assessing the quality of the geospatial data embedded in digital map images is important for analysts to compare them to other datasets. The positional accuracy of maps is discoverable by geostatistical means and for most of the twentieth century government mapping agencies provided these estimates as metadata for map users. For example the United States Geological Survey (USGS) has enforced a National Map Accuracy Standard for all maps produced for the Federal Government. In the case of the USGS's popular topographic quadrangles (1:24,000 scale) all features are estimated to be within one foot per ten thousand feet. While this information may not be available for maps produced before the early twentieth century many official map-making agencies such as USGS or the British Ordinance Survey do provide this metadata which would be useful for assessing data quality.

In addition, the lineage of a map or the sources and methods that went into its production can also be very useful for analysts to assess the quality of the geospatial data and its appropriateness for use in comparison to other datasets.

Functional requirements:

Interpret: Interpret or assess the geospatial data contained in the map.

Application Profile

The three main principles of metadata standards are simplicity, interoperability and extensibility (Zeng and Qin, 2008, p.10).

Interoperability Principle
The elements within the application profile were taken from other established metadata standards. This makes for a more productive process in the creation of our metadata standard and also allows for interoperability. The metadata standards used in the application profile include: Preservation Metadata Implementation Strategies (PREMIS), Copyright Metadata (CopyrightMD), Dublin Core, and Content Standard for Digital Geospatial Metadata (CSDGM). Using these established standards will lead to crosswalks and allow sharing of metadata across collections from other institutions.

Simplicity Principle
Within the application profile, the principle of simplicity is followed by acknowledging that not every detail about the resource is included in the element set. There are 27 elements within the standard, but not all of them are required. It is our consensus that the number of elements and the degree of description are not overwhelmingly complex for the identified user groups.

Our standard also uses a principle found in many metadata standards, the one to one principle. In this case, one record is used for one object or map. There are not multiple objects or maps for one record. The metadata standard we created is also not intended for use in describing collections. This is a possibility in the future and the standard might allow the use of other metadata elements to describe an entire collection.

Extensibility Principle
This principle allows for the addition of new elements or sub-elements to a metadata standard. In our standard, there are no restrictions to the addition of more elements that would allow for a richer description. Many of the elements within the standard do not include value content standards and allow the use of free text. These elements might benefit, in the future, from sub elements, with controlled vocabularies. This is possible as more information is available about the resource and requirements for more description are identified.

Metadata Schema

DC=Approved Dublin Core elements and qualifiers
CSDGM= Approved Content Standard for Digital Geospatial Metadata elements and qualifiers
PREMIS=Approved Preservation Metadata Implementation Strategies elements and qualifiers
Copyright MD = Approved Copyright Metadata elements and qualifiers
The key for the element requirements is:
R=Required
RA=Required if applicable
O=Optional

Element Set: Description

Element: Title
Name: Title
Identifier: DC. Title
Definition: Chief name of map
Required: R
Repeatable: Y
Comments: N/A
Example: Wytfliet's Map of the World 1598; and
The Notable High Buildings of the World 1896

Element: Creator
Name: Creator
Identifier: DC. Creator
Definition: A person, organization or service who is primarily responsible for making the map.
Required: RA
Repeatable: Y
Comments: Surname, First Name
Example: Mitchell, Samuel Augustus

Element: Publisher
Name: Publisher
Identifier: DC. Publisher
Definition: Entity that published, printed, or produced the map; entity that made the resource available.
Required: RA
Repeatable: Y
Comments: Can be a a person, an organization, or a service
Example: John Cary
Whittaker, Treacher & Co.

Element: Date
Name: Date
Identifier: DC.Date
Definition: Map Creation or publication date
Required: RA
Repeatable: Y
Comments: Use encoding scheme W3CDTF profile of ISO 8601
Example: 1876

Element: Description
Name: Description
Identifier: DC.Description
Definition: An account of the map
Required: R

Repeatable: Y
Comments: Description may include but is not limited to: an abstract, a table of contents, a graphical representation, a free-text account of the resource, map features, keywords.
Examples:
Hand colored
Relief shown by hachures
Shows routes of James Cook and the U.S. Exploring Expedition
Includes inset drawings of comparative river lengths and heights in the Western Hemisphere
Includes inset maps of the Northern Hemisphere and Southern Hemisphere

Element: Spatial Coverage
Name: Spatial Coverage
Identifier: CSDGM.IdentificationInformation.SpatialDomain.BoundingCoordinates
Definition: the limits of coverage of a data set expressed by latitude and longitude values in the order western-most, eastern-most, northern-most, and southern- most. For data sets that include a complete band of latitude around the earth, the West Bounding Coordinate shall be assigned the value -180.0, and the East Bounding Coordinate shall be assigned the value 180.0
Required: RA
Repeatable: N
Comments: floating point integers expressing angular measurements of meridians and parallels in decimal degrees, where longitude west of the prime meridian and latitude south of the equator are expressed as negative numbers and all other values are expressed as positive numbers.
Example: westbc: -73.2330
eastbc: -71.9825
northbc: 43.0946
southbc: 41.5966

Element: Temporal Coverage
Name: Temporal Coverage
Identifier: DC. Coverage.Temporal
Definition: The time period or date range covered by the map
Required: R
Repeatable: Y
Comments: Free text. Temporal topic may be a named period, date, or date range.
Example: 1880

Element: Subject:
Name: Subject
Identifier: DC. Subject
Definition: Topic of the map
Required: R
Repeatable: Y
Comments: Use LCSH or free text; typically, the subject will be represented using keywords, key phrases, or classification codes. Recommended best practice is to use a controlled

vocabulary. To describe the spatial or temporal topic of the resource, use the Coverage element.
Example: Mountains/Rivers

Element: Language
Name: Language
Identifier: DC. Language
Definition: Language in which map is written
Required: R
Repeatable: Y
Comments: ISO 639, 3-letter code
Example: “eng” for English; “jpn” for Japanese

Element: Identifier
Name: Identifier
Identifier: DC. Identifier
Definition: An unambiguous reference to the map
Required: R
Repeatable: Y
Comments: Use URL, DOI, and, if applicable, local cataloging number such as LCC, DDC, or map collection document number
Example: http://www.lib.utexas.edu/maps/ams/japan_city_plans/
Image No. 0372026

Element: Relation
Name: Relation
Identifier: DC. Relation
Definition: A reference to an unspecified type of related resource
Required: O
Repeatable: Y
Comments: Map series, atlas containing map or article explaining map
Example: Map is page 205 from *A New Universal Atlas Containing Maps of the various Empires, Kingdoms, States and Republics Of The World*…published by S. Augustus Mitchell, Philadelphia.
See article: Wolter, John. “The Heights of Mountains and Lengths of Rivers.” Quarterly Journal of the Library of Congress. July, 1972.

Element Set: Spatial Reference Information

Element: Horizontal Coordinate System
Name: Horizontal Coordinate System
Identifier: CSDGM.SpatialReferenceInformation.HorizontalCoordinateSystemInformation
Definition: Geodetic Model and Map Projection used for map creation
Required: RA
Repeatable: N
Comments: free text, datum or spheroid followed by map projection
Example: North American Datum 1983, UTM Zone 17N

Element: Map Scale
Name: Map Scale
Identifier: MMGP.MapScale
Definition: values for scale found on the map and (if not expressed as a ratio on the map) for scale ratio
Required: RA
Repeatable: N
Comments: free text for scale given on map; scale ratio required if any map scale is indicated on the map.
Example: “one inch equals one mile”, 1:63,360
Element: Postional Accuracy
Name: Postitional Accuracy
Identifier: CSDGM.DataQualityInformation.PostionalAccuracy
Definition: an assessment of the accuracy of the positions of spatial objects.
Required: O
Repeatable: N
Comments: free text
Example: accurate to +/- 5 feet for 200 feet ground distance

Element: Map Lineage
Name: Map Lineage
Identifier: MMPG.mapline
Definition: a brief statement of the sources and methods used for creating the map
Required: RA
Repeatable: N
Comments: free text
Example: Based on a Survey Taken 1900.

Element Set: Technical

Element: Format
Name: Format
Identifier: DC. Format
Definition: Type of format for the digital file
Required: M
Repeatable: Y
Comments: IMT: Internet Media Type
Example: pdf, tiff, jpg, gif

Element: Hardware
Name: Hardware
Identifier: PREMIS. Hardware
Definition: Describes the hardware required for viewing the object.
Required: O
Repeatable: N
Comments: None
Example: PC, monitor, memory requirements

Element: Software
Name: Software
Identifier: PREMIS: Software
Definition: Describes the software necessary for viewing the object
Required: M
Repeatable: Repeatable for more than one software type
Comments: Use software names that are recognizable (for example, do not use ***Photoshop***, but use ***Adobe Photoshop*** instead)
Example: ***Adobe Reader***, pdf software

Element: File Size
Name: File Size
Identifier: MMGP.File Size
Definition: Size in KB or MB of the object
Required: M
Repeatable: N
Comments: Use numeric value with measure (KB, MB for describing the number value
Example: 136 KB

Element: File Location
Name: File Location
Identifier: MMGP.File Location
Definition: Describes where the digital object is located
Required: M
Repeatable: Y
Comments: Use a URL
Example: http://www.lib.utexas.edu/maps/maryland.html

Element Set: Preservation

Element: Physical Condition
Name: Physical Condition
Identifier: PREMIS.Physical Condition
Definition: Describes the condition of the object
Required: O
Repeatable: N
Comments: Free text
Example: Some loss, poor condition, unreadable

Element: Scan Date
Name: Scan Date
Identifier: PREMIS. Scan Date
Definition: For those maps that have been digitized, it would indicate the date of the scanning. This is helpful in preservation to know the year it was scanned in order to determine the technology employed
Required: O

Repeatable: Y
Comments: Date from ISO standards
Example: 10/01/2010

Element Set: Rights Management

Element: Copyright Status
Name: Copyright Status
Identifier: CopyrightMD.status
Definition: Indicates copyright status for the resource
Required: O
Repeatable: Y
Comments: There are six enumerated values enforced by the CopyrightMD Schema
copyrighted - under copyright
pd_Public - Public domain: No further information
pd_usfed - Public domain: U.S. Federal document
pd_holder - Public domain:item dedicated to the public domain by the rights holder.
pd_expired - Public domain: item in the public domain because of expiration of copyright based on U.S. Law
unknown - Copyright status of the resource is unknown
Example: “Copyrighted”; “Unpublished”, “pd_Public”, “pd_usfed”; “pd-holder”

Element: Copyright Statement
Name: Copyright Statement
Identifier: CopyrightMD.general.note
Definition: Contains a general note regarding copyright information for the resource.
Required: O
Repeatable: N
Comments: Use for any relevant general information relating to copyright for the resource, or to the information relating to copyright for the resource.
Example: “Transmission or reproduction of materials protected by copyright beyond that allowed by fair use requires the written permission of the copyright owner”

Element: Copyright Date
Name: Copyright Date
Identifier: CopyrightMD.date
Definition: The Year the resource was copyrighted. Use only if Copyright Status is “Copyrighted”
Required: O
Repeatable: N
Comments: Supply the year the resource was copyrighted typically based on a copyright notice on the resource itself. Do not approximate copyright year if it does not appear on the work, or in some reliable alternate source for this information. Use the standardized form of YYYY, and do not include month or day information.
Example: 1900

Element: Copyright Owner
Name: Copyright Owner
Identifier: CopyrightMD.rights.holder
Definition: A reference to an unspecified type of related resource
Required: O
Repeatable: N
Comments: Wrapper element for information about the rights holder for the resource and contact information for the rights holder or rights holder’s designee.
Example: Renee Laursen Photography

Element: Citation
Name: Citation
Identifier: MMPG.citation
Definition: citation for publication of digital map image requested by collection
Required: RA
Repeatable: N
Comments: free text
Example: Library of Congress, Geography and Maps

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List of Tables:

Table 1: Mapping metadata elements to functional requirements of user's tasks

Table 1 lists all data elements defined in the Application Profile, including descriptive information, geographic information, technical and preservation information and rights management. Each data element is listed with the entity and logical attribute or relationship to which it corresponds (as defined in the Functional Requirements of Bibliographic Records FRBR model with some modifications, and is then mapped to one or more of the following above users' tasks.

Table 2: Sample record created according to the application profile

Table 2 lists the metadata elements developed in the application profile for describing digital map.

Table 1: Mapping metadata elements to functional requirements of user's tasks

Functional Requirements											Metadata elements	FRBR	
Resource discovery				Resource use				Data management					
Search	Identify	Select	Obtain	Restrict	manage	Operate	Interpret	Identify	Process	Sort	Data element	Entity	Attributes/Relationships
▪	▪		▪								Title	Manifestation	Title
▪	▪										Creator	Corp. body/Person	Name of Corp. body/Person
	▪		▪								Publisher	Manifestation	Publisher/distributor
	▪	▪	▪								Date	Manifestation	Date of publication
		▪									Description	Expression	Summarization of content
		▪									Temporal Coverage	Expression	Representation of temporal coverage
		▪									Spatial Coverage	Expression	Representation of spatial coverage
▪	▪										Subject	Concept/Object/Event/Place (COEP)	Term for COEP
								▪	▪		Source of subject (Controlled vocabulary)	Data element	Source of data element
	▪	▪	▪				▪				Language	Expression	Language of expression
	▪		▪								Identifier	Manifestation	Manifestation identifier
▪	▪										Relation "Is part of"	Manifestation	Whole/Part
Geographic Information													
							▪				Horizontal Coordinate System	Expression	Geodetic, grid
	▪	▪					▪				Map Scale	Expression	Scale
							▪				Positional Accuracy	Expression	Geodetic, grid
							▪				Map Lineage	Expression	Geodetic, grid
Technical Information													
	▪	▪	▪		▪						Format	Manifestation	Physical medium of carrier
		▪			▪	▪					Hardware	Manifestation	Capture medium
		▪			▪	▪					Software	Manifestation	Capture mode
	▪	▪	▪		▪						File Size	Manifestation	Size of carrier
	▪	▪	▪		▪						File Location	Manifestation	Location of carrier
Preservation Information													
	▪	▪			▪						Physical Condition		
	▪	▪			▪						Scan Date		
Rights Management													
				▪							Copyright Status	Manifestation	Access restrictions
				▪							Copyright Statement	Manifestation	Access restrictions
	▪										Copyright Date	Manifestation	Access control info.
	▪		▪								Copyright Owner	Manifestation	Access control info.
	▪		▪								Citation	Manifestation	Manifestation creator info.

Table 2: Metadata Record for digital map

ELEMENT SET	**ELEMENT**	**VALUE**
DESCRIPTION		
	Title	Egypt city plans 1:10,000 : Alexandria
	Variant title	Alexandria
	Variant title	Alexandria, Egyptian region United Arab Republic
	Edition	2nd ed.
	Creator	United States. Army Map Service.
	Place of publication	Washington, D.C.
	Publisher	Army Map Service, Corps of Engineers.
	Date	1960
	Physical description	1 map on 4 sheets ; 69 x 312 cm. on sheets 87 x 89 cm. or smaller.
	Description	"Compiled in 1959 from Egypt City Plans 1:10,000, Survey of Egypt, Alexandria No. 3 and Alexandria No. 4 printed 1956...Planimetric detail revised by photo-planimetric methods. Map not field checked."
	Temporal Coverage	1960
	Spatial Coverage	westbc=29.76; eastbc=29.82; northbc=31.17; southbc=31.08
	Subject	Alexandria (Egypt)--Maps, Topographic.
	Language	Eng
	Identifier “URL”	http://www.lib.utexas.edu/maps/egypt.html
	Relation	
SPATIAL REFERENCE INFORMATION		
	Horizontal Coordinate System	European Datum, Transverse Mercator
	Map Scale	Scale 1:10,000
	Positional Accuracy	unknown

	Map Lineage	Unknown
TECHNICAL		
	Format	JPEG Image
	Hardware	I2S DigiBook(a 10000 pixel RGB linear array A0 overhead scanner) Contex Chroma TX 40" wide format scanner Software
	Software	Color correction, compositing and image processing operations performed in Adobe Photoshop CS2
	File Size	5.44 MB; dimensions: 5,478px × 5,186px (scaled to 571px × 541px)
	File Location	http://www.lib.utexas.edu/maps/world_cities/txu-oclc-439083692-alexandria2-1959.jpg
PRESERVATION		
	Physical Condition	
	Scan Date	
RIGHTS MANAGEMENT		
	Copyright Status	Copyrighted
	Copyright Statement	Transmission or reproduction of materials protected by copyright beyond that allowed by fair use requires the written permission of the copyright owners. Works not in the public domain cannot be commercially exploited without permission of the copyright owner. Responsibility for any use rests exclusively with the user.
	Copyright Date	1960
	Copyright Owner	United States, Army Map Service.
	Citation	University of Texas, Perry-Castaneda Library Map Collection

White Paper submitted for the Digital Library for the Maghreb Workshop
Held in Washington, DC, January 24-25, 2011

Digital Infrastructure and Repository Technology

Peter R. Young
Recently retired from Library of Congress
and Anchi Hoh, PhD.
Special Assistant to the Chief
Asian Division, Library of Congress[1]

Summary

This sub-theme paper -- digital infrastructure and repository technology -- addresses requirements for transfer, archival storage, administration, access, and management of shared digital resources. This concept paper identifies infrastructure requirements and repository technology needed to facilitate digital resource sharing. The following topics are addressed: 1) digital infrastructure requirements and digital resource lifecycle, including interoperable network architecture, digital content transfer, storage, administration, access and management; 2) digital repository technology requirements, and 3) digital resources sharing models appropriate to national and research libraries.

Introduction

This paper provides addresses topics related to the Digital Infrastructure and Repository Technology sub-theme of the China-North America Library Conference at the National Library of China. The Conference theme – *Sharing Digital Resources: Challenges and Opportunities* – represents an important and timely opportunity to explore the potential for the bilateral sharing and exchange of digital data and information between libraries serving China and North America. The paper explores principles and concepts related to digital infrastructure and networking as applied to national, research, and other types of libraries. Issues related to digital repository technology are explored as well and the paper concludes with descriptions of several potential digital exchange projects by which China and North American libraries might collaborate together in developing pilot projects and initiatives related to the sharing of digital resources.

Digital information technology provides challenges for libraries and archives of all different types to address a growing demand for capturing, collecting, organizing, and preserving digital data and information that is increasing at an exponential rate. This growing corpus of digital content and data requires the development and reference to a lifecycle of digital information resources. Such a digital resource life cycle is quite similar (but different in certain respects) to that of non-digital (or analog) resources. As a result, the digital information lifecycle requires a descriptive framework to assist in planning for suitable infrastructure and preservation repository requirements.

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[1] This paper reflects the personal views and observations of the authors and does not represent official policies or positions of the Library of Congress or the U.S. Federal government. Originally prepared for the China–North America Library Conference, 9 Sept. 2010, China

Digital Infrastructure and Lifecycle

According to the 1996 RLG Report, “Preserving Digital Information: Report of the Task Force on the Archiving of Digital Information,”

“Information objects in digital form, like those in other forms, move through life cycles. They are created, edited, described, and indexed, disseminated, acquired, used, annotated, revised, re-created, modified and retained for future use or destroyed by a complex, interwoven community.”[i] *According to the Library of Congress definition, the lifecycle of digital objects is a way to “refer collectively to a set of modular processes that govern the existence, authenticity, and usability of digital content over time. For some digital content, all life cycle processes may occur exclusively within the LC [or another institution]. Other content may pass through life cycle processes that are external to LC [or another institution]. Regardless of where processes occur, each ideally should be actively managed to ensure that content persists for as long as necessary. The life cycle is not a rigidly sequential, mandatory series of steps.*”[ii]

Each lifecycle process is composed of three dimensions: 1) activities – namely, the actions of those who generate and manage digital objects; 2) policies and best practices – this dimension involves guidelines that govern the execution of processes, directives, and instructions; 3) technical infrastructure – tools and systems needed to conduct processes are the key elements in this dimension. The third requirement underlines the importance of technical infrastructure in the lifecycle of digital objects in any reliable digital repository.

The digital lifecycle has been captured and demonstrated in various illustrations. Following are two examples represented by the Open Archive Information System (OAIS) Reference Model and the UK-based Digital Curation Centre. (see next page)

Fortunately, these frameworks for developing a functional model addressing the requirements of the digital resource life cycle include the Consultative Committee for Space Data Systems (CCSDS) 2000 publication Reference Model for an Open Archival Information System (OAIS). The OAIS model was developed to be used to create:

“…a broader consensus on what is required for an archive to provide for the permanent, or indefinite long-term, preservation of digital information. [It] establishes a common framework of terms and concepts which comprise an Open Archival Information System (OAIS). It allows existing and future archives to be more meaningfully compared and contrasted. It provides a basis for further standardization within an archival context and it should promote greater vendor awareness of, and support of, archival requirements.”[2]

Digital Repository Infrastructure Technology

The OAIS Functional model identifies six functional entities and related interfaces including ingest, archival storage, data management, administration, preservation planning, and access. These aspects of the OAIS model identify essential components of an interoperable infrastructure required for the management, administration, and services

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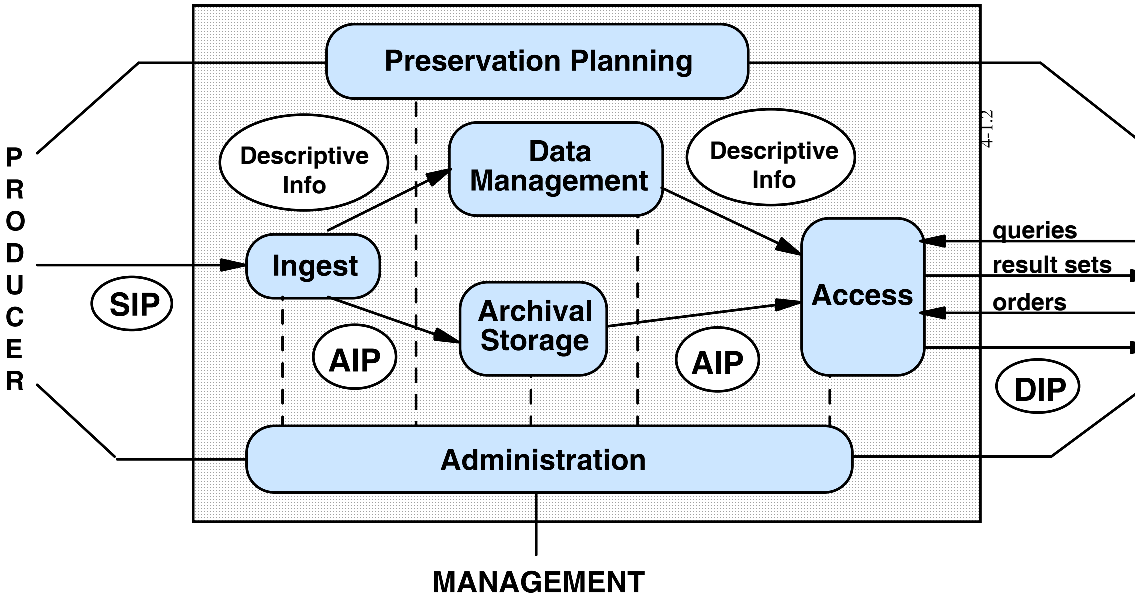
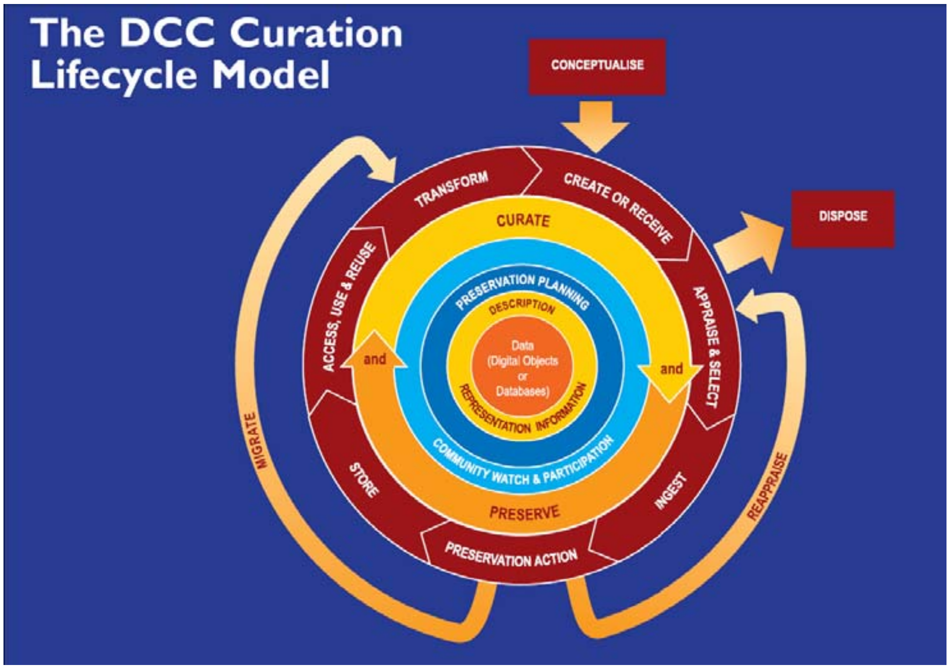
[2] Reference Model for an Open Archive Information System. Consultative Committee for Space Data Systems, January 2002, NASA.



Digital Lifecycle Open Archival Information System (OAIS) Reference Model
Source: Michael Day, "The Reference Model for an Open Archival Information System (OAIS)" (http://www.digitalpreservationeurope.eu/preservation-training-materials/files/vilnius-oais-new.ppt#339,3,OAIS background. Accessed August 2, 2010).



Resource: "The DCC Curation Lifecycle Model (http://www.dcc.ac.uk/sites/default/files/documents/publications/DCCLifecycle.pdf. Accessed August 2, 2010).

of a library digital infrastructure. Infrastructure is a term used to describe is the basic physical and organizational structures needed for the operation of a society or enterprise, or the services and facilities necessary for an economy to function. The term typically refers to the technical structures that support a society, such as roads, water supply, sewers, power grids, telecommunications, and so forth. Viewed functionally, infrastructure *facilitates* the production of goods and services; for example, roads enable the transport of raw materials to a factory, and also for the distribution of finished products to markets.

In 2003, the Library of Congress Office of Strategic Initiative and Library Services jointly provided a high level outline of technical infrastructure requirements in an eight-phased digital lifecycle. Based on provenance, format, and other factors, each set of digital objects goes through various phases of the lifecycle. Thus born digital materials may be treated differently from digital objects that come through e-journal subscriptions or digitally reformatted materials. In a project, the eight phases often form a circling cycle to meet the needs of preservation and access. Here is the more detailed description of the eight phases. Currently, the phase of “transfer” is being considered for addition.

- Planning: A set of digital objects is defined and planned for management throughout one or more lifecycle processes;
- Production: digital objects are being generated or reformatted.
- Acquisition/Obtaining: receipt or capture of digital objects.
- Selection: decisions are made regarding the addition of digital objects to Library collections as well as determinations about appropriate levels of preservation and access.
- Description: digital objects are being described, characterized, and placed in appropriate context.
- Preparation/Assembling: Technical steps are taken to ensure that the digital content can be sustained in authentic and usable form.
- Making available: authorized provision of digital objects to user communities.
- Sustainability: trustworthy maintenance of authentic and accessible digital objects within their proper contexts over long periods of time.

Throughout this lifecycle, the following essential elements concerning technical infrastructure are highlighted: content systems and services; workflow management; monitoring and auditing; security (authentication and authorization; encryption/decryption/ key management); storage; data processing capacity; tools to manage systems operation, availability, performance and configuration; and tools to support business transactions.[iii]

Another way of examining infrastructure requirements in repository technology is to view the lifecycle as four major components: transfer, selection, preservation, and retrieval. The four components are interconnected by configuration management, name space management, work-flow management, metadata management, inventory management, storage management, access management, and format management.

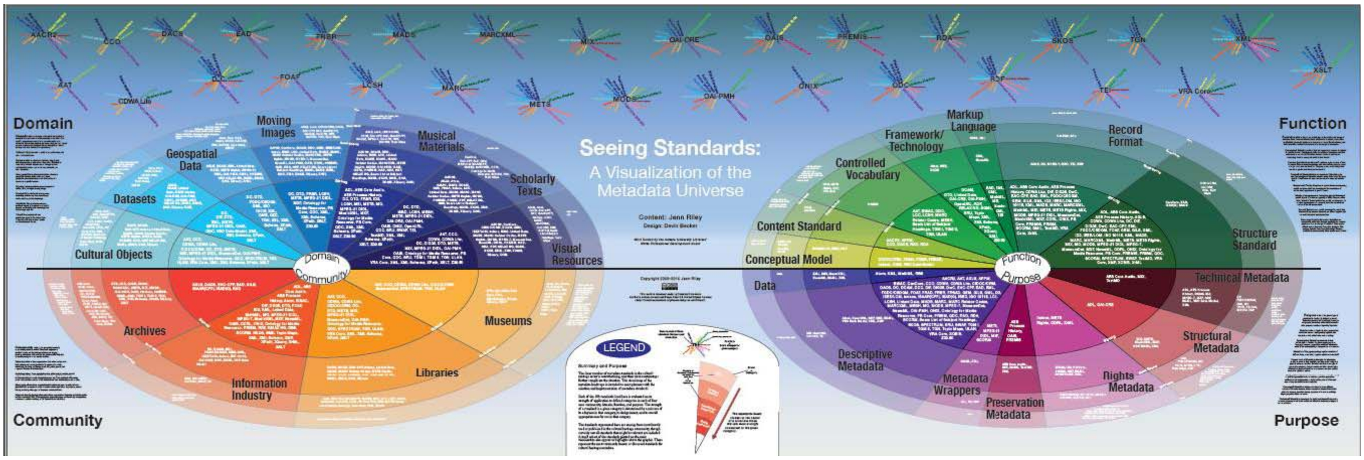
Moreover, a reliable and trusted repository requires the following functionalities: validation, verification, search & index, content modeling, and report generation.[iv]

The vision of a border crossing or collaborative digital repository infrastructure is well stated by the Digital Repository Infrastructure Vision for European Research II (DRIVER II) as "global, interoperable, trusted, [and] long-term."[v] DRIVER II serves as a good example that in a collaborative digital repository infrastructure, aside from defining the digital lifecycle, metadata standards and the need of building a trusted digital repository become major challenges and at the same time key elements to success.

Sharing Digital Resources

Digital resource sharing may be approached from two aspects - content management and search/discovery services. Content management involves collection storage management and data administration, and format management and metadata standards. To further narrow down the scope of this subject, metadata standards alone are a major area for discussion and require broad collaboration in building a trusted digital repository. Metadata is generally divided into three categories: administrative, structural, and descriptive. Administrative data includes acquisition information, rights and reproduction, access restrictions, location or ownership information, and technical metadata such as file format, size and data of creation. Structural metadata describes how an object or collection is structured. As for descriptive metadata, it covers access and retrieval information and discovery.

To illustrate the complexity and diversity of metadata standards, Jenn Riley of Indiana University Libraries compiled a chart encompassing 105 most commonly known or discussed metadata standards that were determined by their strength of application in four axes: community, domain, function, and purpose. See the chart below:



Resource: Jenn Riley, "Seeing Standards: A Visualization of the Metadata Universe" (http://www.dlib.indiana.edu/~jenlrile/metadatamap/seeingstandards.pdf. Accessed August 2, 2010).
Copyright 2009-2010 Jenn Riley.

According to Riley, domain refers to the types of materials the standard is intended to be used. In this axis, domain is further broken down to cultural objects, datasets, geospatial data, moving images, musical materials, scholarly texts, and visual resources. The community axis is broken down to libraries, archives, museums, and information industry. Function is the role a standard plays in the creation and storage of metadata and may be analyzed from the following categories: conceptual models, content standards, controlled vocabularies, framework/technology, markup languages, record formats, and structure standards. Purpose refers to the type of metadata the standard is designed to capture and may be categorized into descriptive metadata, metadata wrappers, preservation metadata, rights metadata, structural metadata, and technical metadata.[vi]

Trusted Digital Repositories

In 2007, the Center for Research Libraries (CRL) and OCLC Online Computer Library Center jointly recommended the concept of a "Trusted Digital Repository" (TDR) through a certification process, titled "Trustworthy Repository Audit & Certification: Criteria & Checklist (TRAC)." A TDR needs to provide "reliable, long-term access to managed digital resources to its designated community, now and into the future."[vii] A digital repository faces many potential threats such as failure in media, hardware, and software; communication errors; failure of network services, economy, and an organization; obsolescence of media, hardware, and software; natural disaster; and external and internal attacks.

TRAC further recommends that all repositories should be encouraged to meet a set of requirements, among which is technologies, technical infrastructure, and security. Following is the break-down list of requirements in this category.

- General system infrastructure requirements;
    - Appropriate technologies that meet the system infrastructure requirements, with additional criteria specifying the use of technologies and strategies appropriate to the designated community(ies).
    - Security of IT systems, such as servers, firewalls, routers, fire protection systems and flood detection.[viii]

Pilot Projects - *National Library Digital Exchange Service*

The Library of Congress seeks to explore and test the feasibility of a purely online digital exchange relationship with a select number of International Exchange Service (IES) institutional partners. Along with the technical testing of exchange of official government publications in online digital formats, LC, in collaboration with its IES project partners, will attempt to resolve intellectual property permissions issues; identify solutions for any problems associated with both embedded and imported metadata for the exchanged titles; and evaluate the project results. An underlying assumption of the project is that the exchange of publications in tangible formats will be maintained.

LC will guide partners in identifying URLs from which U.S. government content in online digital files can be captured. LC will need the same assistance from its partners in the project for sites in their respective countries.

LC envisions that partners will need to be prepared to:

- Designate a point of contact for the project;
- Participate in conference calls and other scheduled meetings;
- Collaborate with LC to develop and execute a project plan that includes a timeline, deliverables, and methodology for evaluation;
- Monitor and report on technical experiences, quality control issues, intellectual property issues, and any matters relating to the digital exchange;
- Participate in evaluation of the project.

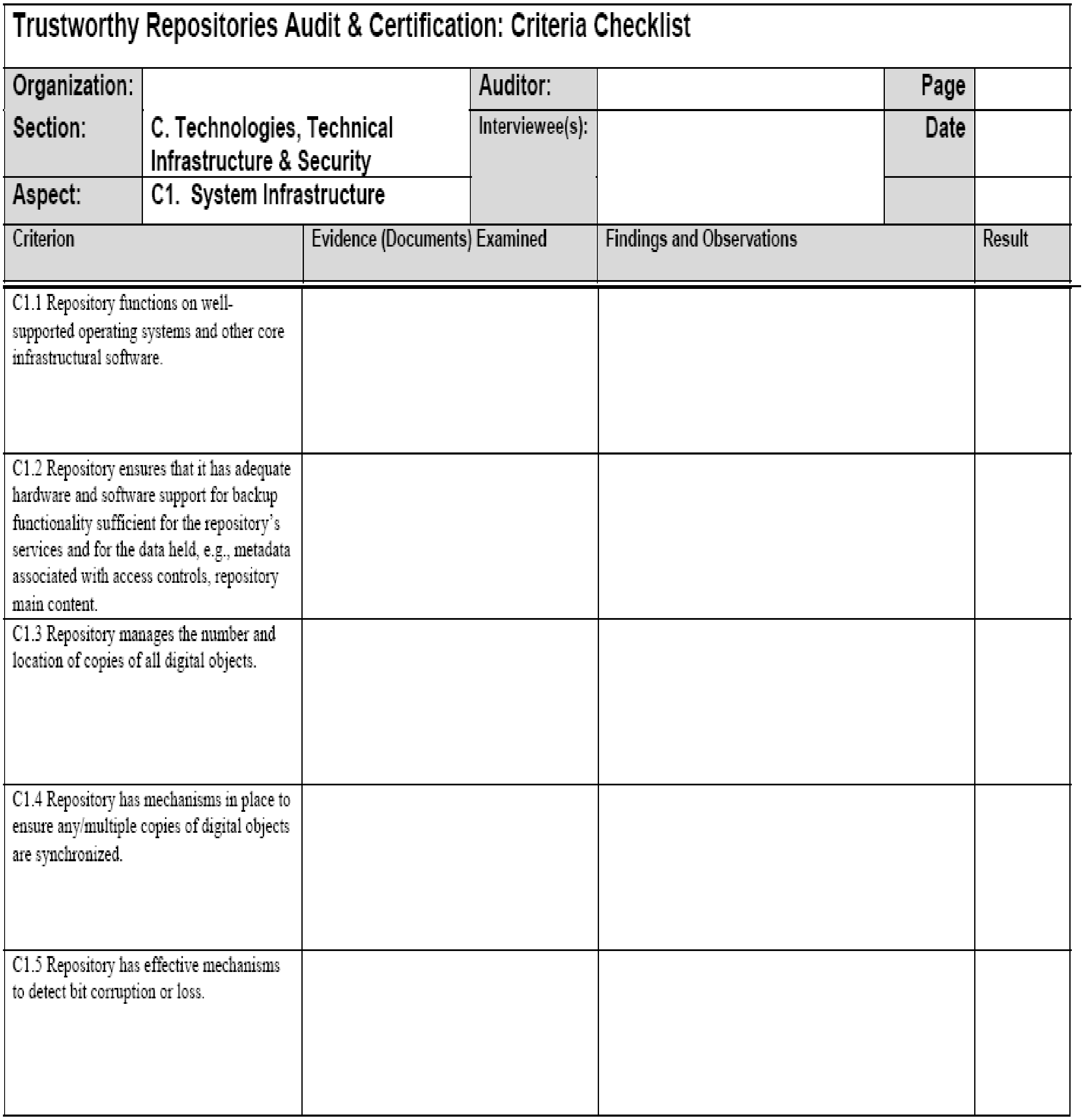
Potential partners and participants on the U.S. side are the Government Printing Office (GPO), the National Archives and Records Administration (NARA), and other interested Federal Government agencies.

Arrangements for such a project involving the exchange of digital resources between national libraries such as the Library of Congress and the National Library of China would enable both institutions to explore various technical, policy, and operational workflow aspects of digital content exchange. A number of alternative arrangements are possible to facilitate a national library digital exchange including an agreement by each national library to host access to a digital archive consisting of official state/government material which is maintained by the single institution. An alternative arrangement involves each library to transmit archived digital content to the partner library so that repository hosts provide access through their respective infrastructures. Another alternative involves the development of a federated archive of archived digital content accessible through a common index, catalog, or interface. These alternatives present opportunities to incorporate different types of content including: scholarly discourse and communication, research data, commercially owned cultural content, and collectively created Web content.

The development of robust and flexible digital infrastructure and repository technologies is an essential component for sharing digital resources. While the technology and repository architecture structures may differ from institution to institution, it is essential that these environments evolve collaboratively between North American and Chinese libraries in order to facilitate communication and understanding. While institutional commitment and participation are essential for progress in these areas, equally important are the contributions from information technology corporations, publishers, and other components of the digital content value chain. The contribution that many organizations have made in the China-North America Library Conference constitutes a wonderful start for achieving success in a variety of initiatives and projects resulting from these discussions and deliberations.

Appendix: Trusted Digital Repository Technologies, Technical Infrastructure and Security Criteria Checklist (Sample)

(Resource: "Trustworthy Repositories Audit & Certification: Criteria and Checklist" (http://www.crl.edu/sites/default/files/attachments/pages/trac_0.pdf. Accessed August 2, 2010), prepared by CRL and OCLC, 2007.)



Trustworthy Repositories Audit & Certification: Criteria Checklist

Organization:		**Auditor:**		**Page**	
Section:	**C. Technologies, Technical Infrastructure & Security**	**Interviewee(s):**		**Date**	
Aspect:	**C1. System Infrastructure**				

Criterion	Evidence (Documents) Examined	Findings and Observations	Result
C1.1 Repository functions on well-supported operating systems and other core infrastructural software.			
C1.2 Repository ensures that it has adequate hardware and software support for backup functionality sufficient for the repository's services and for the data held, e.g., metadata associated with access controls, repository main content.			
C1.3 Repository manages the number and location of copies of all digital objects.			
C1.4 Repository has mechanisms in place to ensure any/multiple copies of digital objects are synchronized.			
C1.5 Repository has effective mechanisms to detect bit corruption or loss.			

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Jenn Riley, "Seeing Standards: A Visualization of the Metadata Universe" (http://www.dlib.indiana.edu/~jenlrile/metadatamap/seeingstandards.pdf. Accessed August 2, 2010).

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(http://www.crl.edu/sites/default/files/attachments/pages/trac_0.pdf. Accessed August 2, 2010).

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[ii] "The Digital Life Cycle Glossary," *Library of Congress Digital Life Cycle Management*, (www.loc.gov/staff/deog/resources/lifecycle/lifecycle_purpose.htm. Accessed July 8, 2010).

[iii] Library of Congress Office of Strategic Initiatives, "Introduction to the Digital Life Cycle Framework," July 15, 2003.

[iv] Babak Hamidzadeh, "Repository Development Center (RDC)," Library of Congress Office of Strategic Initiatives, 2009.

[v] Dale Peters, "Infrastructure Challenges for Global Repositories," presented to African Digital Scholarly Conference, Pretoria, May 2009, (http://www.driver-support.eu/documents/Peters_AfricanDigitalScholarship.pdf. Accessed August 2, 2010).

[vi] Jenn Riley, "Seeing Standards: A Visualization of the Metadata Universe" (http://www.dlib.indiana.edu/~jenlrile/metadatamap/seeingstandards.pdf. Accessed August 2, 2010).

[vii] "Trustworthy Repositories Audit & Certification: Criteria and Checklist," prepared by CRL and OCLC, 2007, (http://www.crl.edu/sites/default/files/attachments/pages/ trac_0.pdf. Accessed August 2, 2010).

[viii] See Appendix.